



LANCASHIRE COUNTY COUNCIL



ANNUAL REPORT
of the
COUNTY ANALYST
for
THE YEAR 1959

Printed by

F. Taylor & Co. (Blackpool) Ltd., Back Regent Road, Blackpool. Tel. 28387/8




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PUBLIC HEALTH AND HOUSING COMMITTEE

(1960)

The Chairman of the County Council :

COUNTY ALDERMAN SIR ANDREW SMITH, C.B.E., J.P.

The Vice-Chairman of the County Council :

COUNTY ALDERMAN SIR ALFRED BATES, M.C., D.L.

The Chairman of the Finance Committee :

COUNTY COUNCILLOR J. SELWYN JONES, J.P.

The Chairman of the Health Committee :

COUNTY ALDERMAN T. HOURIGAN, J.P.

Chairman of Committee :

COUNTY ALDERMAN J. W. THORLEY

Vice-Chairman :

COUNTY COUNCILLOR F. L. NEEP

County Aldermen :

W. BANNISTER, Esq. H. J. BRETT, Esq.
SIR THOMAS TOMLINSON, J.P.

County Councillors :

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HAROLD KAY, Esq.	F. WHITWORTH, Esq.
H. WILLIAMS, Esq.	

.. (One Vacancy)

LANCASHIRE COUNTY LABORATORY

STAFF 1960

County Analyst :

G. H. WALKER, PH.D., B.Sc., F.R.I.C.

Deputy County Analyst :

A. C. BUSHNELL, F.R.I.C.

Senior Assistant Analyst :

J. COTTAM, B.Sc., F.R.I.C.

Second Senior Assistant Analyst :

M. S. GREEN, B.Sc., A.R.I.C.

Assistant Analysts :

J. L. WILLIAMS

G. W. EARNSHAW

K. FISHER

R. E. BRIDGE, M.Sc.

MRS. D. FORBES, B.Sc., A.R.I.C.

R. STUBBS, B.Sc.

A. HOLLIS, B.Sc.

T. HODSON

C. E. FENN

Laboratory Assistants :

MRS. B. SCOTT

MRS. M. S. NEWTON

MISS M. HARRISON

Clerical Staff :

E. L. SIMPSON, T.D., F.C.C.S.

H. HIGGINSON, A.C.C.S.

MISS O. THOMAS

MISS S. HARPLEY

Laboratory Attendant :

MRS. E. FLETCHER

LANCASHIRE COUNTY COUNCIL

ANNUAL REPORT OF THE COUNTY ANALYST FOR THE YEAR 1959.

To the Chairman and Members of the Lancashire County Council.

I have the honour to submit for your consideration my fourteenth Annual Report which deals with the work carried out in the County Laboratory during the year ended 31st December, 1959. The total number of analyses and tests carried out in this period was 13,819 ; in order to facilitate reference these have been grouped under the following headings :—

Part I. Reports on samples taken under the Food and Drugs Act, 1955. Page 7.

Part II. Report on Heat-treated Milk Samples taken under the Milk (Special Designation) (Pasteurised and Sterilised Milk) Regulations, 1949 to 1953. Page 91.

Part III. Report on samples taken under the Fertilisers and Feeding Stuffs Act, 1926. Page 96.

Part IV. Report on Waters, Effluents, etc. Page 102.

Part V. Radioactivity. Page 106.

Part VI. Miscellaneous (including Atmospheric Pollution). Page 120.

The total number of samples from all sources examined during the year is the highest recorded for the laboratory. The number of samples examined for the County under the Food and Drugs Act and the Fertilisers and Feeding Stuffs Act (excluding, however, milk samples submitted for Phosphatase, Methylene Blue or Turbidity Tests) was 8,324. Your analyst was appointed Public Analyst for the County Borough of Barrow-in-Furness as from the 1st October, 1959, and the number of Food and Drug samples submitted by the 12 Autonomous Food and Drugs Authorities, for which he now acts as Public Analyst, was 2,397.

The number of Food and Drugs samples (excluding appeal-to-cow samples) submitted by the County Sampling Officers during the year 1959 was 8,256 as against 8,225 during the previous year and 8,239 in the year 1957 ; the rate of samples per 1,000 of the population was 5·76 in the year under review, 5·81 in 1958 and 5·88 in 1957.

The number of County Food and Drugs samples has, therefore, been maintained well above the level reached in 1947 (6,819). Prior to 1947, the highest figure was 5,263 in the year 1933. During the year the number of samples found to be adulterated or unsatisfactory was 373 ; this corresponds to an adulteration rate of 4·5 per cent., as against 4·9 per cent. in the year 1958, and 4·2 per cent. in the year 1957. Table 4 gives the percentage adulteration for the last 10 years and it will be seen that there has been an appreciable drop over that period compared with the years 1941 to 1948 when the adulteration rate varied from 9·3 to 5·7 per cent. Viewed in the light of the figures for the last 10 years and for the period immediately preceding, the adulteration rate for the year, 1959, cannot be regarded as altogether unsatisfactory although it is higher than in the years immediately preceding the war when the percentage adulteration varied from 2·6 to 4·2.

In addition to Food and Drugs samples the County Sampling Officers submitted 1,202 samples of heat-treated milk for examination by the Phosphatase test, the Half-hour Methylene Blue test or by the Turbidity test as against 1,145 samples submitted in the previous year. Of these, 12 failed to pass the Phosphatase test and no sample failed to pass the statutory Methylene Blue test ; the corresponding figures for the year 1958, being six and one. The number of Specified Areas in the County in which only designated milks can be sold is continually increasing due to the making of Milk (Special Designations) (Specified Areas) Orders and by the 6th April, 1959, a total of 90 of the 93 County Districts in the County Food and Drugs Area had become Specified Areas. As a result of this policy on the part of the Government, more and more milk sold under special designations is being consumed and in view of the fact that it is the duty of the Food and Drugs Authority to enforce the provisions of Section 37 of the Food and Drugs Act, 1955, it follows that an increased number of samples is now being taken by County Sampling Officers in the County Districts concerned for submission to the County Laboratory for examination by the statutory Phosphatase, Half-hour Methylene Blue or Turbidity tests.

As usual some two-thirds of the Food and Drugs samples submitted by the County Sampling Officers consisted of samples of milk. Of 5,294 milk samples, 198 were found to be adulterated which represents an

adulteration rate of 3·7 per cent. The corresponding figure for the year 1958 was 4·3 per cent. and for the year 1957 it was 3·5 per cent. Milk adulteration in the County of Lancaster has, in general, shown consistent and appreciable decreases since the year 1946. It is reasonable to assume that these decreases are in some measure due to the increased sampling which has occurred since that year.

The adulteration rate for samples other than milk was 5·9 per cent. and is 0·2 per cent. lower than that obtained in the year 1958 when the figure was 6·1 per cent. The adulteration rate for the last 10 years has varied from 2·8 to 6·1 per cent., the former figure in the year 1950 and the latter in the year 1958. The commodities which showed a relatively high proportion of unsatisfactory samples and, therefore, contributed especially to the adulteration rate included flour, sausages, samples containing extraneous matter and samples whose labels did not conform to the requirements of the Labelling of Food Order. An examination, however, of table 21 and the sections of the report concerned with the commodities just mentioned will bring to light the fact that many of the samples reported as unsatisfactory showed only slight irregularities in composition or minor infringements of labelling requirements.

Several new Statutory Regulations which affect the work of the Public Analyst have been made in the year under review. Three of these are concerned with ice-cream and are mentioned in some detail in the section of this report dealing with that commodity. Briefly, the Food Standards (Ice Cream) Regulations, 1959, prescribe new standards for ice-cream omitting the previous minimum standard for sugar content but prohibiting the addition of artificial sweeteners. The most important addition is, however, the introduction of special standards for dairy ice-cream, cream ice and milk ice which must not contain any fat other than milk fat. The Labelling of Food (Amendment) Regulations, 1959, impose restrictions on labels and advertisements relating to ice-cream and the Ice-Cream (Heat Treatment, etc.) Regulations, 1959, specify alternative conditions for the pasteurisation and conditions for the sterilisation of the ingredients (after mixing) of ice-cream. The Arsenic in Food Regulations, 1959, prescribe the first Statutory Standards in this country for arsenic in food. In general, they follow closely the recommended maximum limits for arsenic suggested as far back as the year 1903 by the Royal Commission on Arsenic and which have since always been accepted in trade practice. The Condensed Milk Regulations, 1959, amend the previous regulations and provide for an additional type of condensed milk, viz., partly skimmed (half-cream) condensed milk, which is required to be labelled with the words "should not be used for babies except under medical advice." The Fluorine in Food Regulations, 1959, drastically reduce the previous Statutory limits for fluorine in baking

powder, self-raising flour, etc., as it is no longer necessary to make the ingredient acid calcium phosphate from rock phosphate (which has a high natural fluorine content). In addition to Statutory Regulations three reports of the Food Standards Committee were published during the year 1959 by the Ministry of Agriculture, Fisheries and Food. The first deals with soft drinks and recommends important amendments to the Food Standards (Soft Drinks) Order including requirements as to the labelling and fruit content of soft drinks containing fruit or fruit juice. The second deals with milk bread and, in general, recommends a statutory standard which corresponds closely to that prescribed in 1955 for "National Milk Bread" although the definition of bread of this description was deleted from the Bread Order in the subsequent year. The last is a very detailed report concerned with Preservatives in Food and it is described in the paragraphs of this report dealing with new Regulations. It is recommended that all foods which at present contain preservative should continue to do so. In addition to the two preservatives at present permitted in certain foods, viz., sulphur dioxide and benzoic acid, it is recommended that certain other preservatives should be permitted in appropriate instances. The new preservatives are propionic acid, sorbic acid, methyl and propyl-p-hydroxybenzoates and the antibiotic nisin.

During the year under review, 55 samples from all sources, including Autonomous Authorities, were reported upon adversely because they contained foreign matter and a further 15 samples were found to contain insects or insect remains. The corresponding figures for the year 1958 were 68 containing foreign matter and 21 containing insects. Many of the samples are described in the appropriate sections of the report and it will be seen that the foreign substances found to be present were very varied in character.

As in previous years it has been found that a number of prepacked samples did not conform to the requirements of the Labelling of Food Order and brief details of the more interesting of these will be found in the section of the report dealing with the Order and in table No. 21. In this connection particular attention is drawn to the account given of a sample of enriched rice and samples of pollen capsules examined for Autonomous Food and Drugs Authorities. Reference to the section dealing with ice-cream shows that the composition of this commodity has been well maintained above the level imposed by the first Food Standards (Ice-Cream) Order which was made in the year 1951. In this section also will be found details of the composition of samples of dairy ice-cream which for the first time are under statutory control. In the section dealing with cream, mention is made of four samples of double cream which were found to contain traces of formaldehyde derived from the material of the cartons in which they had originally been packed.

Some comments are also made in the report with regard to cream cheese, drawing particular attention to the difficulty experienced in recent years of obtaining this commodity, at least in this part of the country.

The work on radioactivity which was commenced during the year 1958, was continued throughout the year under review. Ninety-eight samples, including milk, other foods, tap water and rainwater, were examined for radioactivity from fall-out and the results obtained are described in Part V of this report and in tables 33 to 37. Although no nuclear weapon tests occurred during the year under review intensive tests had been carried out during 1958. The peak of fall-out from these tests was found to occur in April to June, 1959. However, as a result of there being no nuclear explosions in 1959 not only had both the total Beta activity and the Strontium 90 fallen by the end of that year to approximately one-tenth of the peak figures (see table 33) but also Strontium 90 fall-out averaged over the whole of the year was not greatly different in amount to that reported by the United Kingdom Atomic Energy Authority for the previous year.

Part VI of the report is concerned with samples of a miscellaneous nature which cannot be conveniently included in previous sections of the report. Investigations which may be of interest include the work done for certain authorities on atmospheric pollution, the examination of milk bottles and foods contaminated by foreign matter, the analysis of a sample of cake colouring, the reason for an alleged complaint that skimmed milk powder was unsatisfactory in use, an investigation into the nature of scorch marks on leaves and the examination of samples submitted in connection with central purchasing.

I wish to take this opportunity of expressing my appreciation of the efficient manner in which all members of the staff, both analytical and clerical, have carried out their various duties, and to thank the Sampling Officers, both of the County and the Autonomous Food and Drugs Authorities, by whose willing co-operation the work of the laboratory has been greatly facilitated.

To the members of the County Council and to the County Medical Officer of Health I desire to tender my most grateful thanks for their continued encouragement and support and for their unfailing interest in the work of the laboratory.

I have the honour to be, Mr. Chairman, Ladies and Gentlemen,

Your obedient Servant,

GEO. H. WALKER,

County Analyst.

The County Laboratory,
County Hall,
Preston.

3rd August, 1960.

TOTAL SAMPLES EXAMINED

During the year 1959, a total of 13,819 analyses and tests have been carried out in the County Laboratory. They are classified in the following table :—

Table 1

County Samples—

Food and Drugs Act (including 5,294 milks)	...	8,256
Appeal-to-Cow	... ..	18
Fertilisers and Feeding Stuffs Act, 1926	...	50
Food and Drugs Act samples (including three Appeals - to - Cow) from the following autonomous Food and Drugs Authorities—		
County Borough of Barrow-in-Furness	...	68
Borough of Chorley	... ..	61
Borough of Darwen	... ..	94
Urban District of Huyton-with-Roby	...	277
City of Lancaster	... ..	164
Borough of Leigh	... ..	142
Borough of Middleton	... ..	217
Borough of Morecambe and Heysham	...	175
Urban District of Newton-le-Willows	...	82
County Borough of Preston	... ..	591
County Borough of Southport	... ..	310
County of Westmorland	... ..	216
	—	2,397

Fertilisers and Feeding Stuffs Act, 1926—

Preston County Borough	... ..	10
Southport County Borough	... ..	11
County of Westmorland	... ..	16

Other Samples (from all sources including the County)—

Potable Waters	... ..	95
Other Waters and Effluents	... ..	34
Miscellaneous	... ..	445
Milk Samples.—Phosphatase Tests	... ..	1,115
Milk Samples.—Methylene Blue Tests	... ..	1,111
Milk Samples.—Turbidity Tests	... ..	261

Total number examined ... 13,819*

*Ninety-eight of these samples were examined for Radioactivity.

The total number of samples analysed in the year is compared with the total numbers similarly classified for the previous years 1912-1958, in table 2. It will be seen from the table that, since the year 1912, the grand total of samples examined amounts to 322,419.

Table 2

Total number of Samples examined during the years 1912 to 1959

Year	County Food and Drugs	Other Authorities Food and Drugs	County Appeal-to-cow Samples	Other Authorities Appeal-to-cow Samples	Fertilisers and Feeding Stuffs Act	Waters and Effluents	Miscellaneous and Departmental	Total Phosphate, Methylene Blue and Turbidity Tests	Total
1912-1947	162538	3850	2236	71	786	2368	2856	1129	175834
1948	6958	783	59	13	31	46	88	1052	9030
1949	7700	1060	53	10	52	77	98	1425	10475
1950	8104	1040	38	1	58	113	149	1595	11098
1951	8501	1337	28	9	54	196	203	1602	11930
1952	8622	1418	40	12	53	126	208	1745	12224
1953	8635	1345	50	11	59	112	237	1797	12246
1954	8089	1612	67	3	62	84	250	1949	12116
1955	8373	1983	49	5	76	118	288	2463	13355
1956	8215	2177	27	11	59	120	328	2508	13445
1957	8239	2007	77	2	80	121	387	2499	13412
1958	8225	2110	55	5	86	95	414	2445	13435
1959	8256	2394	18	3	87	129	445	2487	13819
1912-1959	260455	23116	2797	156	1543	3705	5951	24696	322419

PART I.—SAMPLES TAKEN UNDER THE FOOD AND DRUGS ACT, 1955

The Food and Drugs Act, 1955, came into operation on the 1st January, 1956, and it consolidates and places on a permanent footing those parts of the Food and Drugs Act, 1938, and post war Acts and Regulations which were in operation up to the 1st January, 1956.

During the year under review, several new Regulations have been made which relate to the work of the Public Analyst. The following list contains the more important of these :—

The Milk and Dairies (General) Regulations, 1959.

The Labelling of Food (Amendment) Regulations, 1959.

The Food Standards (Ice-Cream) Regulations, 1959.

The Milk (Special Designations) (Specified Areas) Order, 1959.

The Arsenic in Food Regulations, 1959.

The Ice-Cream (Heat Treatment, etc.) Regulations, 1959.

The Condensed Milk Regulations, 1959.

The Fluorine in Food Regulations, 1959.

The Food Standards (Ice-Cream) Regulations, the Ice-Cream (Heat Treatment, etc.) Regulations and the Labelling of Food (Amendment) Regulations are discussed in the section of this report dealing with ice-cream. The Milk (Special Designations) (Specified Areas) Order is referred to in Part II of the report while the four remaining regulations are briefly discussed below.

The Milk and Dairies (General) Regulations, 1959, replace the Milk and Dairies Regulations, 1949 to 1954 and are mainly concerned with the registration of dairy farms and dairies and the necessary requirements for the hygienic production and distribution of milk. Regulation 29, however, reproduces the requirement in the previous regulation that any receptacle used for the conveyance or storage of skimmed or separated milk, or for containing such milk at any time when it is exposed for sale, shall be marked with the appropriate words either "skimmed milk" or "separated milk." The maximum fine for a first offence under these regulations is now £100 whereas previously it was £20.

The Arsenic in Food Regulations came into operation on the 10th August, 1959. They prescribe the first Statutory limits for arsenic in food in this country although as far back as the year 1903 the Report of the Royal Commission on Arsenic made recommendations for maximum limits for arsenic in solid and liquid foods. These recommendations, although never made Statutory, have always been regarded as a guide to good trade practice and have even been accepted as recognised limits in the Courts. The Statutory limit now prescribed is one part of Arsenic (as As) per million parts of the food and this is substantially the same as the limit of one-hundredth of a grain of arsenic (as As_2O_3) per pound recommended by the Royal Commission on Arsenic in 1903. In addition to the above general limit it is provided that fish, edible seaweed and foods containing them may contain arsenic in excess of one part per million if it is present naturally. The Regulations also include special limits for the arsenic contents of certain specified foods. These special limits range from 0.1 part per million in the case of certain non-alcoholic beverages and 0.5 part per million for ice-cream to as much as 5.0 parts per million for dried herbs, spices, etc. The Regulations do not apply

to hops or hop concentrates intended for commercial brewing. No special limit is included in the regulations for synthetic food colours ; presumably, therefore, these should comply with the general limit of one part per million. The regulations also provide that where the certificate of a Public Analyst discloses that a food does not comply with the appropriate Statutory limit for its arsenic content, the food may be treated for the purpose of Section 9 of the Food and Drugs Act, 1955, as being unfit for human consumption and it may be seized and destroyed on order of a Justice of the Peace.

The Condensed Milk Regulations, 1959, came into operation on the 26th June of the year under review and they amend and consolidate the Public Health (Condensed Milk) Regulations, 1923 to 1953. They provide for the sale of an additional type of condensed milk, viz., sweetened or unsweetened partly skimmed (half-cream) condensed milk, which is required to be labelled with the words “ should not be used for babies except under medical advice.” All cans of condensed milk must, as previously, bear a label stating the equivalent, in pints, of the appropriate type of fresh milk and again, as formerly, condensed skimmed milk, whether sweetened or unsweetened, must be labelled either “ unfit for babies ” or “ not to be used for babies.” An exemption from the requirements of Subsection 3 of Section 109 of the Food and Drugs Act is included in the Regulations thereby enabling Food and Drugs Authorities to institute proceedings in respect of contraventions of the labelling requirements without first giving notice of their intention to do so to the Minister of Agriculture, Fisheries and Food.

The Fluorine in Food Regulations, 1959, were made on the 10th December of that year and came into operation on the 14th March, 1960. The new regulations have been made following two reports by the Food Standards Committee published in the years 1953 and 1957 which both recommended substantial reductions in the limits permitted for the fluorine content of foods containing acidic phosphates by the then existing Fluorine in Food Order, 1947. The limits for fluorine prescribed by the 1947 Order were unavoidably high due to the supply position and the necessity of making some acid calcium phosphate from rock phosphate with a high natural fluorine content. The use of rock phosphate for this purpose is no longer necessary and the fluorine content of foods containing acidic phosphates can, therefore, be kept within much

lower limits. The new Regulations, therefore, provide the following new limits for the fluorine contents of the undermentioned foods :—

Food	Maximum Fluorine Content (expressed in terms of parts per million)
1. Self-raising flour or any similar mixture (not included in item 2 below) containing a farinaceous substance and an acidic phosphate.	3
2. Baking Powder, including golden raising powder.	15
3. Any article or substance (not included in any of the foregoing items) used as an ingredient in the preparation of food and consisting wholly or partly of an acidic phosphate.	30 (of the acidic phosphates present)

As in the case of the Arsenic in Food Regulations the Fluorine in Food Regulations also provide that where any food is certified by a Public Analyst as being food which it is an offence to sell under these regulations, then the food may be treated for the purpose of Section 9 of the Food and Drugs Act, 1955, as being unfit for human consumption and may be seized and destroyed on the order of a Justice of the Peace.

In addition to new Regulations three reports of the Food Standards Committee were published by the Ministry of Agriculture, Fisheries and Food during the year under review. The reports are concerned with soft drinks, milk bread and preservatives in food respectively.

The Food Standards (Soft Drinks) Order, 1953, was made as a temporary measure to continue in operation the standards, with certain modifications, which up to that time had been contained in Ministry of Food Control Orders. During the year 1954 your Committee drew the attention of the County Councils Association to the unsatisfactory labelling and composition of orange drinks sold in one-third pint bottles. This particularly applies to drinks made from whole fresh oranges which, from the wording of the Order, are not required to contain a definite amount of orange or orange juice but are only required to be made from a prescribed weight of oranges. In some methods of manufacture it by no means follows that the finished product will actually contain the prescribed amount. The Food Standards Committee have considered this and other aspects of the Standards Order and the report published during the year under review embodies their recommendations for the amendment of the Order. The amendments suggested are quite extensive and include the following :—Soft drinks containing fruit or fruit juice should be labelled with the amount present and there should

also be minimum fruit or fruit juice contents prescribed ; this should also apply to drinks made from comminuted oranges and other citrus fruit, these should be described simply as “ orange drink,” etc., and not as “ drinks made from whole fresh oranges ”; the use of saccharin in soft drinks, other than in drinks sold expressly for diabetics and in tonic waters, should be prohibited ; it is not considered that the control of carbonated and flavoured beverages is necessary (apart from prohibiting the use of saccharin), these would then be required to bear a label declaring a list of ingredients ; it is also recommended that no nutritional claim based on the carbohydrate content of a soft drink should be permitted and that the use of the word “ glucose ” should be prohibited in regard to the labelling and advertising of soft drinks, the Committee do not consider that a special standard for glucose beverages is justified ; it is proposed to restrict the acids used in soft drinks containing fruit or fruit juice to citric, tartaric and malic acids and in other soft drinks to these acids and lactic, acetic and phosphoric acids. The addition of ascorbic acid is permissible to soft drinks containing fruit ingredients, to make up the amount originally present in these ingredients, provided any claim of the presence of Vitamin C complies with the appropriate Code of Practice ; as far as practicable the above recommendations should also apply to all sales of soft drinks by a caterer.

It will be remembered that the Bread (Amendment) Order, 1955, made provision for the retail sale of National Milk Bread at a price higher than the maximum prescribed for National Bread ; this “ national milk bread ” was made from flour containing six per cent. of skim milk powder. The sale of bread containing skim milk solids under the above description was the subject of much adverse criticism by Public Analysts and Food and Drugs Authorities and in 1956 another amending order deleted the classification “ national milk bread ” from the principal Order. Since that time there has been no Statutory requirement in this country for the composition of milk bread. In view of the uncertainty as to what descriptions, in relation to composition, are now acceptable under the Food and Drugs Act the Food Standards Committee decided to report on this subject before submitting its report on the general question of bread and flour standards. In their report the Committee state that they are divided on the question of description. The majority would permit the name “ milk bread ” to be used for bread containing a specified minimum of either whole milk solids or skim milk solids while the minority would prefer the description “ dairy bread ” to be used for bread made with skim milk or skim milk powder. The Committee were, however, unanimous that the minimum standard for either whole milk solids or skim milk solids should be 4·2 per cent. calculated on the weight of the loaf. This proposed standard is equivalent, in the case of bread of normal moisture content containing skim milk powder, to the

previous standard of 6 per cent. skim milk powder in the flour used for making "national milk bread." If the description "milk bread" is permitted for bread containing either whole milk solids or skim milk solids then the labels, or a notice in the shop, should state which is present. Labels or advertisements bearing either words or pictorial designs suggesting that bread made from skim milk contains whole milk should be prohibited and no claims should be made that milk bread is rich in any of the nutrients of milk, although factual statements of the percentages present are permissible.

The Preservatives Sub-Committee of the Food Standards Committee was appointed in 1951 to review the Public Health (Preservatives, etc., in Food) Regulations. In view of the wide range of the investigations which were necessary it was decided to report on each class of substances separately and reports have been published on antioxidants, colouring matters and emulsifying and stabilising agents. The first two of these have already resulted in the making of Statutory Regulations. The report published during the year under review is concerned primarily with actual food preservatives and it completes the investigations of the Sub-Committee. The report is very comprehensive, it makes recommendations for changes in the general form of the Regulations and it considers the possible effect on health of chemical preservatives, both those at present permitted and others which have been brought to the notice of the Sub-Committee. Some 27 pages are concerned with detailed consideration of different types of foods and recommendations are made as to whether or not they should be permitted to contain preservative. One of the first recommendations is that the list of common substances which are excluded by the Regulations from the definition of preservative should be amended and in particular, that the addition of saltpetre to foods should be controlled. This recommendation is made because of the possibility of its reduction to nitrite in sufficient amount to cause poisoning. The two preservatives at present permitted in scheduled foods, viz., sulphur dioxide and benzoic acid, will still be permitted and all foods which are at present allowed to contain preservative will continue to do so although certain modifications are suggested, especially in regard to fruit pulp and other fruit products, soft drinks, pickles, sauces and cured meats. In some instances where alternative preservatives are recommended for individual foods, for example, sulphur dioxide or benzoic acid in soft drinks, the present regulations only allow one to be present but it is now recommended that where it seems desirable mixed permitted preservatives may be used but the amounts of each present expressed as a percentage of the permitted amounts should not together exceed 100. The use of certain preservatives not previously permitted in this country are recommended in appropriate cases. Propionic acid and sorbic acid are recommended in

order to inhibit mould growth in bread and cakes respectively. Methyl or propyl-p-hydroxybenzoates are recommended for unfermented grape juice for sacramental purposes, tomato pulp, flavouring syrups, liquid rennet, drinking chocolate concentrates and liquid coffee (or coffee and chicory) extracts. Sorbic acid is also suggested because of its anti-mould properties, as a preservative in cheese, marzipan, solutions of food colours and in silicone anti-foam emulsions. The antibiotic nisin is present naturally in certain cheeses and these are not liable to clostridial spoilage. Other types of cheese are, however, very liable to this form of spoilage which causes "blowing" and other deterioration. It is now recommended that all types of cheese (including processed cheese and cheese spread) should be permitted to contain nisin either natural or added. The addition of nisin is also regarded as permissible to certain canned foods, i.e., "foods in hermetically sealed containers which have been sufficiently heat processed to destroy *Clostridium Botulinum* or the pH of which is less than 4.5." One of the chief merits of the addition of nisin is that it virtually eliminates thermophilic spoilage which can occur quite extensively when canned foods are stored under too warm conditions. The above definition of canned foods is designed to exclude canned clotted cream, olives in brine, marinated fish and certain meat products where the use of nisin may not be free from the hazard of botulism or salmonellae poisoning. Other substances which are not at present permitted to contain preservative but for which a recommendation is made that they should be permitted to do so are :—dry root ginger, peeled raw potatoes, vinegar and liquid pectin. The report also contains recommendations with regard to the use of diphenyl or O-phenylphenol as preservatives for fresh citrus fruit and certain non-citrus fruit ; these recommendations were submitted to Ministers prior to the publication of this report and after considering them the Ministers made two amendments during the year 1958 to the existing Public Health (Preservatives, etc., in Food) Regulations. Finally, the sub-committee consider that requirements as to the labelling of foods containing preservative or the labelling of substances sold as preservatives should more appropriately be made under the Labelling of Food Order and that these should be considered when this Order is next reviewed.

*Particulars of Samples of Food and Drugs submitted by County
Sampling Officers*

In table 3 there is a list of all the articles of food and drugs which were submitted during the year, 1959, from the County of Lancaster together with the number of each kind and also the number found to be adulterated.

Table 3

Samples examined under the Food and Drugs Act during 1959

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Ale Ingredients		1		1				
Almonds, Ground		23	1	24		4		4
Almond Paste		1		1				
Ammoniated Mercury Ointment		10		10				
Antiseptic Solution		1		1				
Arrowroot		13		13				
Aspic Jelly Powder		1		1				
Aspirin Tablets		15		15				
Aspirin Tablets, Soluble ...		2		2		1		1
Aspirin Tablets, Children's ...		4		4		1		1
Baby Food		1		1				
Bacon		21		21				
Baking Powder		11		11				
Barley		32		32		1		1
Barley Flour		1		1				
Biscuits		2		2				
Black Puddings		1		1				
Blancmange Powder		16		16				
Borax		21		21				
Borax and Honey		4		4				
Boric Acid		6		6				
Boric Acid Ointment		13		13				
Boric Lint and Dressings ...		21		21		4		4
Brandy	1	1		2				
Bread		42		42		15		15
Bread, Starch reduced		2		2				
Bread, Brown		4		4				
Bread, Fancy		3		3				

Table 3—continued.

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Bread Sauce		1		1				
Breakfast Cereal		9		9				
Butter		68		68				
Cake Mixture, Sweetened ...		4		4				
Cake Mixture, Unsweetened ...		1		1				
Calcium Gluconate Tablets ...		3		3				
Camphorated Oil		15		15		2		2
Castor Oil		26		26				
Cheese (including Processed Cheese)		32		32		1		1
Cheese, Cream		3		3		3		3
Cheese Spread		11		11		2		2
Chicken, Curried, Canned ...		1		1				
Chicken, Chopped, Canned ...		1		1		1		1
Chicken Breast, Canned ...		1		1				
Chicken Fillets, Canned ...		1		1		1		1
Chicken Boned, Canned ...		1		1				
Chicken, Minced (in Jelly), Bottled		1		1		1		1
Chicory and Coffee Extract Mixture, Dry		1		1				
Chocolate, Drinking		1		1				
Chocolate Flavoured Drink ...		2		2				
Chutney		4		4				
Cocoa		12		12				
Coconut, Desiccated		3		3				
Codeine Tablets, Compound ...		10		10				
Cod Liver Oil		8		8				
Cod Liver Oil Emulsion ...		2		2				
Coffee		31		31		1		1
Coffee Extract, Dry		3		3				
Coffee and Chicory		2		2				

Table 3—continued.

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Coffee and Chicory Extract Mixture, Dry		2		2				
Coffee and Chicory Essence, Liquid, Sweetened		31		31		2		2
Cooking Fat		21		21				
Cooking Oil		1		1				
Cornflour		17		17				
Cornish Pasty, Frozen		1		1				
Cough Medicine		3		3				
Cough Tablets		1		1				
Cream, Single and Double		24		24		4		4
Cream, Sterilised		26		26		1		1
Cream of Tartar		8		8				
Curry Powder		8		8				
Custard Powder		30		30				
Dandelion Coffee		1		1				
Dandelion Coffee Essence		1		1		1		1
Dessert Powder		3		3				
Dripping		8		8				
Dumpling Mixture		1		1				
Epsom Salts		30		30				
Figs, Syrup of		7		7				
Fish, Bottled or Canned		38		38				
Fish Cakes		2		2		1		1
Fish Dressing		2		2				
Fish Fingers, Frozen		2		2				
Fish Paste		16		16				
Fish, Potted		7		7				
Flour		26		26		9		9
Flour, Self-raising		30		30				
Flour Confectionery (Jam Tarts, etc.)		56		56		6		6

Table 3—continued.

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Fruit, Canned		72		72		5		5
Fruit Curd		45		45		3		3
Fruit, Dried		119	1	120		7		7
Fruit, Fresh (Oranges, Apples, etc.)		30		30				
Fruits, Glace, Mixed		1		1				
Fruit in Jelly, Bottled		1		1				
Fruit Juices, Bottled and Canned		12		12		1		1
Fruit and Nuts		1		1				
Gelatine		5		5				
Gin	8	1		9				
Ginger, Crystallised		3		3				
Ginger, Ground		1		1				
Glucose		2		2				
Glucose Drink		3		3				
Glycerin		15		15		3		3
Glycerin of Borax		7		7		1		1
Golden Eye Ointment		1		1				
Golden Raising Powder		9		9				
Gravy Browning		8		8				
Haemorrhoid Tablets		1		1				
Halibut Oil Capsules		2		2				
Headache Powders		1		1				
Headache Tablets		2		2				
Health Salts		18		18		1		1
Herbal Medicine		3		3				
Herbal Tea		1		1				
Herbal Tablets		1		1				
Herbs, Dried, Culinary		12		12				
Honey		30		30				

Table 3—continued.

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Hypophosphites, Compound Syrup of		9		9		1		1
Ice-Cream		52		52		2		2
Ice-Cream, Dairy		8		8				
Ice-Cream, Cold Mix Powder ...		1		1				
Ice Lollies		27		27		6		6
Ice Lolly Syrup		1		1				
Indian Brandee		1		1				
Indigestion Tablets		2		2				
Influenza Tablets		2		2				
Iodine, Tincture of		11		11		1		1
Iodine Paint		1		1		1		1
Jam		24		24		1		1
Jelly, Table		41		41				
Jelly, Table, Compound ...		1		1				
Jelly Cake Piping		1		1				
Lard		30		30				
Liver Pills		1		1				
Lollipops, Liquid		3		3				
Macaroni		1		1				
Malt Extract		1		1				
Malt Extract and Vitamin Compound		7		7				
Malt Extract with Cod Liver Oil		21		21				
Malt, Milk and Cocoa Beverages		2		2				
Margarine		54		54				
Marmalade		15		15		1		1
Marzipan		3		3				
Meat, Frozen (Steaklets) ...		3		3		2		2
Meat, Canned		21		21		3		3

Table 3—continued.

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Meat, Cooked		3		3		1		1
Meat Extract		3		3				
Meat Paste		7		7				
Meat Pies		2		2		2		2
Meat and Potato Pie		1		1		1		1
Meat, Potted		4		4				
Meat Pudding, Canned ...		1		1				
Meat and Vegetable, Canned ...		4		4				
Milk	3054	1935	305	5294	115	66	17	198
Milk, Channel Islands ...	210	55		265	11	2		13
Milk, Condensed, Full Cream, Sweetened		1		1				
Milk, Condensed, Special Full Cream, Sweetened		2		2				
Milk, Condensed, Full Cream, Unsweetened		10		10				
Milk, Condensed, Skimmed Sweetened		6		6				
Milk, Dried		12		12				
Milk and Malt Food		1		1				
Milk Powder, Skimmed ...		1		1				
Milk Shake Powder		1		1				
Mincemeat		24		24				
Mint Sauce		1		1				
Muffin		1		1				
Mustard Compound		6		6				
Mustard, Liquid		3		3				
Nasal Inhaler		10		10				
Nutmeg, Ground		1		1				
Nuts		6		6		1		1
Oats, Breakfast		3		3				
Oatcakes		1		1		1		1

Table 3—continued.

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Oatmeal		23		23				
Olive Oil		16		16				
Pancake and Yorkshire Pudding Mixture		5		5				
Paprika		1		1				
Paraffin, Liquid		19		19		3		3
Paraffin, Liquid, Emulsion, with Phenolphthalein		1		1				
Parrish's Chemical Food		15		15		4		4
Peanut Butter		2		2				
Penicillin Tablets		12		12				
Pepper, Black		1		1				
Pepper, White		33		33				
Pickles		47		47		1		1
Polony		1		1				
Potatoes		4		4				
Potato Crisps, etc.		2		2		1		1
Pudding (Christmas, etc.)		33		33		1		1
Pudding Mixture, Sweetened...		4		4				
Raspberry Vinegar and Olive Oil		1		1				
Rice		14		14				
Rice, Ground		1		1				
Rose Hip Syrup		2		2		1		1
Rum	8	1		9				
Rum Butter		1		1				
Sago		2		2		1		1
Salad Cream		16		16				
Salt		22		22				
Salt, Celery		1		1				
Salt, Iodised		1		1				

Table 3—continued.

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Sauce		25		25				
Sausages, Pork		27	1	28		12	1	13
„ Beef		28		28		5		5
„ Cumberland		3		3				
„ Pork and Tomato		1		1				
„ Canned		1		1				
„ with Beans, Canned		1		1		1		1
Sausage Meat, Beef		1		1				
Sausage Rolls		1		1				
Sedative Tablets		1		1				
Seidlitz Powders		5		5		1		1
„ „ Double Strength		2		2				
„ „ Extra Strong		1		1				
Semolina		17		17				
Sherbet		2		2		1		1
Sleeping Tablets		1		1				
Soda Bread Mix		1		1		1		1
Sodium Bicarbonate		6		6				
Soft Drinks, to be diluted		22		22				
„ „ Mineral Waters		26		26		2		2
„ „ Orange Drinks		12		12		4		4
Soft Drink Crystals		1		1				
Soup, Canned		31		31				
Soup Powder		3		3				
Soup Mixture		1		1				
Spice, Mixed, Ground		1		1				
Sponge Cake and Sponge Pudding Mixture, Sweetened		5		5				
Spread (Invert Sugar and Honey)		3		3				
Stuffing		2		2				

Table 3—continued.

Samples	Number examined				Number adulterated or otherwise giving rise to irregularity			
	Formal	Informal	Private	Total	Formal	Informal	Private	Total
Suet, Shredded		28		28		3		3
Sugar		30		30				
Sugar, Icing		8		8				
Sulphadimidene Tablets ...		2		2				
Sweets (including Chocolates and Sweets containing Butter)		68		68		5		5
Sweetmeats		7		7				
Syrup, Table		15		15				
Tapioca		12		12		1		1
Tea		54		54				
Teething Powders		3		3				
Thirst Quenchers		1		1				
Throat Lozenges		1		1				
Tomato Juice, Canned ...		3		3				
Travel Sickness Tablets ...		2		2				
Treacle and Molasses		28		28		1		1
Trifle Pack		1		1				
Vegetables, Canned		6		6		1		1
Vegetables, Dried (Peas, etc.)...		17		17		1		1
Vegetables, Dehydrated ...		2		2				
Vegetables, Frozen		1		1				
Vinegar		1		1				
Vitamin Tablets		10		10		1		1
Wheatgerm, Stabilised ...		3		3				
Whisky	40	2		42				
Wine (British Sherry, British Ruby, etc.)		15		15				
Witch Hazel, Distilled, B.P.C.		1		1		1		1
Yeast Tablets		2		2				
Yoghourt (1 Goats Milk) ...		2		2		1		1
TOTALS	3321	4627	308	8256	126	229	18	373

The Number of Commodities

The variety of commodities on sale is now very large, and this is reflected in the number of different articles of which samples have been taken and submitted for analysis. Two hundred and fifty-six different commodities consisting of food and drugs were examined during the year.

In order to obtain adequate sampling of the common articles of food it is the practice to issue quarterly lists of samples which assist the sampling officers to correlate their samples one with another and at the same time ensure that each area is satisfactorily sampled in respect of any particular commodity. Due to the desirability of allowing considerable latitude in the sampling of other articles where this may be indicated in the public interest, the variety of samples actually examined is considerably increased by the inclusion of commodities in less common demand.

Total Adulteration

During the year under review, 8,256 samples of food and drugs were submitted for examination under the Act, and of these 373 were reported upon adversely ; the total adulteration was, therefore, 4·5 per cent. This represents a decrease compared with the percentage of adulteration for the previous year (1958) when the figure was 4·9 per cent.

In table 4 the percentages of adulteration are given for the past 10 years. It will be seen that during this period the lowest figure is 4·1 which was reached during the year 1956 and that the average figure is 4·6 per cent. In general, the adulteration during and subsequent to the war was considerably greater than that found in preceding years ; while the figure for the year under review cannot be regarded as unsatisfactory when compared with the figures for the last 10 years, it is, however, higher than the adulteration rate for the 10 years 1929-1938, which preceded the war when the percentage adulteration varied from 2·6 to 4·2.

Table 4
Percentage of Adulteration of County Samples of Food and Drugs,
1949-1959

Year	Total No. of Samples	No. of Adulterated Samples	Percentage of Adulteration
1950 	8,104	363	4.5
1951 	8,501	412	4.8
1952 	8,622	404	4.7
1953 	8,635	386	4.5
1954 	8,089	417	5.1
1955 	8,373	413	4.9
1956 	8,215	340	4.1
1957 	8,239	349	4.2
1958 	8,225	405	4.9
1959 	8,256	373	4.5
1950-1959 	83,259	3,862	4.6

Analysis of County Food and Drugs Samples

Table 5 gives the percentage of adulteration over the last 10 years side by side with the various types of samples and with the number of samples taken per 100,000 of the population. The total number of samples and the number of samples per 100,000 of the population for the year under review have been well maintained at the level reached during the year 1947 (6,819 and 505 respectively) and the figures for the last 10 years are much higher than the corresponding figures for any of the previous years in the history of the County Laboratory.

Table 5

Year	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
Percentage of Adulteration ...	4.5	4.8	4.7	4.5	5.1	4.9	4.1	4.2	4.9	4.5
Total Samples ...	8,104	8,501	8,622	8,635	8,089	8,373	8,215	8,239	8,225	8,256
Formal Samples	2,798	2,751	2,654	3,220	2,817	3,300	3,474	3,331	3,337	3,321
Informal Samples	4,858	5,184	5,313	4,761	4,844	4,744	4,404	4,589	4,568	4,627
Private Samples	448	566	655	654	428	329	337	319	320	308
Number of Samples per 100,000 of the population	566	589	599	598	593	613	594	588	581	576

Total Adulteration : the County compared with other Areas

Table 6 gives the percentage of adulteration for the year 1959 for certain other Food and Drugs Authorities whose figures were available at the time of writing. I am indebted to the Public Analysts of the various districts for the information included in this table and also for the figures included in tables 13 and 17. It will be seen that the figure for the County of Lancaster, *viz*, 4·5 per cent. is very slightly higher than the average (4·3 per cent.) for the Authorities mentioned. The range of adulteration for the areas included in the table varied from 9·8 to 1·5 per cent.

Table 6

Total Adulteration, 1959. Various Districts.

Area	No. of Samples	Per cent. of Adult.	Area	No. of Samples	Per cent. of Adult.
Durham, County ...	2,786	2·8	Bristol	4,028	4·3
Kent, County ...	4,783	7·1	Leeds	3,226	4·4
Somersetshire, County ...	3,970	5·5	Leicester	2,224	2·5
Staffordshire, County ...	5,731	2·7	Liverpool	4,281	3·1
Worcestershire, County ...	5,668	9·8	Manchester	2,854	4·0
Birmingham ...	5,550	1·5	Portsmouth	1,511	3·7

Adulteration in County Districts, etc.

There are 93 Districts shown in the Area of the County Food and Drugs authority for the year under review.

Table 7 shows the number of samples taken and the number of adulterated samples in each of the 93 districts together with those relating to 12 autonomous areas. An examination of the table will show that adulteration was nil in 15 of the County Districts as against nil in 16 districts for the year 1958. None of the autonomous areas showed a total freedom from adulteration.

Table 7

Adulteration in the County Districts and in the areas of 12 Autonomous Food and Drugs Authorities during the year 1959

District	Milk		Other Articles		Total	
	Samples	Adult	Samples	Adult	Samples	Adult
Abram U.D.C.	12	0	15	1	27	1
Adlington U.D.C.	26	2	19	0	45	2
Ashton-in-Makerfield U.D.C. ...	62	0	35	2	97	2
Aspull U.D.C.	9	1	26	0	35	1
Atherton U.D.C.	64	1	36	4	100	5
Audenshaw U.D.C.	39	2	21	3	60	5
Bacup Borough	61	0	29	1	90	1
Barrowfield U.D.C.	20	1	5	0	25	1
Billinge and Winstanley U.D.C.	13	0	16	0	29	0
Blackburn R.D.C.	63	7	16	0	79	7
Blackrod U.D.C.	6	1	12	0	18	1
Brierfield U.D.C.	28	0	10	0	38	0
Burnley R.D.C.	63	1	21	0	84	1
Carnforth U.D.C.	15	1	35	3	50	4
Chadderton U.D.C.	95	3	66	6	161	9
Chorley R.D.C.	152	14	38	4	190	18
Church U.D.C.	20	0	15	0	35	0
Clayton-le-Moors U.D.C.	25	2	12	0	37	2
Clitheroe Borough	43	1	19	2	62	3
Clitheroe R.D.C.	54	2	10	0	64	2
Crompton U.D.C.	46	0	19	3	65	3
Dalton-in-Furness U.D.C.	31	5	33	0	64	5
Denton U.D.C.	86	3	49	5	135	8
Droylsden U.D.C.	109	3	33	3	142	6
Failsworth U.D.C.	64	0	31	3	95	3
Farnworth Borough	84	2	61	6	145	8
Fleetwood Borough	65	0	76	8	141	8
Formby U.D.C.	31	2	16	0	47	2

Table 7—continued.

District	Milk		Other Articles		Total	
	Samples	Adult	Samples	Adult	Samples	Adult
Fulwood U.D.C.	42	2	43	2	85	4
Fylde R.D.C.	69	8	23	2	92	10
Garstang R.D.C.	80	6	44	2	124	8
Golborne U.D.C.	61	1	31	0	92	1
Grange U.D.C.	20	0	17	0	37	0
Great Harwood U.D.C. ...	43	3	12	1	55	4
Haslingden Borough	52	2	19	0	71	2
Haydock U.D.C.	37	0	23	0	60	0
Heywood Borough	87	1	41	1	128	2
Hindley U.D.C.	61	0	21	0	82	0
Horwich U.D.C.	43	0	36	2	79	2
Ince-in-Makerfield U.D.C. ...	70	1	31	1	101	2
Irlam U.D.C.	45	0	30	0	75	0
Kearsley U.D.C.	34	1	16	0	50	1
Kirkby U.D.C.	142	5	98	6	240	11
Kirkham U.D.C.	28	0	14	1	42	1
Lancaster R.D.C.	83	4	52	3	135	7
Lees U.D.C.	12	1	8	2	20	3
Leyland U.D.C.	48	3	52	4	100	7
Litherland U.D.C.	108	3	41	1	149	4
Little Lever U.D.C.	16	0	9	0	25	0
Littleborough U.D.C.	36	1	19	1	55	2
Longridge U.D.C.	22	3	8	1	30	4
Lunesdale R.D.C.	68	1	23	0	91	1
Lytham St. Annes Borough ...	70	4	85	4	155	8
Milnrow U.D.C.	35	3	7	1	42	4
Mossley Borough	33	0	17	1	50	1
Nelson Borough	95	2	70	9	165	11
Ormskirk U.D.C.	54	0	60	1	114	1
Orrell U.D.C.	37	0	18	0	55	0

Table 7—continued.

	Milk		Other Articles		Total	
	Samples	Adult	Samples	Adult	Samples	Adult
Oswaldtwistle U.D.C.	65	0	8	0	73	0
Padiham U.D.C.	37	1	13	1	50	2
Poulton-le-Fylde U.D.C. ...	28	2	24	2	52	4
Preesall U.D.C.	14	0	18	0	32	0
Prescot U.D.C.	43	2	22	0	65	2
Preston R.D.C.	128	5	92	4	220	9
Prestwich Borough	105	2	67	15	172	17
Radcliffe Borough	80	1	59	4	139	5
Rainford U.D.C.	9	0	13	0	22	0
Ramsbottom U.D.C.	50	3	32	5	82	8
Rawtenstall Borough	84	1	33	3	117	4
Rishton U.D.C.	20	0	13	0	33	0
Royton U.D.C.	51	3	20	1	71	4
Skelmersdale U.D.C.	16	1	15	1	31	2
Standish-with-Langtree U.D.C.	13	0	31	2	44	2
Thornton Cleveleys U.D.C. ...	55	1	25	1	80	2
Tottington U.D.C.	42	2	13	1	55	3
Trawden U.D.C.	10	0	4	1	14	1
Turton U.D.C.	36	0	25	1	61	1
Tyldesley U.D.C.	42	0	48	1	90	1
Ulverston R.D.C.	155	12	24	0	179	12
Ulverston U.D.C.	36	0	27	2	63	2
Up Holland U.D.C.	20	1	15	1	35	2
Urmston U.D.C.	98	1	107	6	205	7
Walton-le-Dale U.D.C.	84	3	34	2	118	5
Wardle U.D.C.	18	0	7	0	25	0
Warrington R.D.C.	115	2	63	4	178	6
West Lancashire R.D.C. ...	138	6	139	11	277	17
Westhoughton U.D.C.	57	4	18	1	75	5
Whiston R.D.C.	131	0	56		187	1

Table 7—continued.

District	Milk		Other Articles		Total	
	Samples	Adult	Samples	Adult	Samples	Adult
Whitefield U.D.C.	32	0	36	1	68	1
Whitworth U.D.C.	17	1	18	1	35	2
Wigan R.D.C.	52	0	10	1	62	1
Withnell U.D.C.	11	0	4	0	15	0
Worsley U.D.C.	91	5	87	1	178	6
Miscellaneous	294	30	0	0	294	30
Total County Districts	5,294	198	2,962	175	8,256	373
Twelve Autonomous Food and Drugs Authorities	1,245	50	1,149	92	2,394	142
Total—All Sources	6,539	248	4,111	267	10,650	515

Adulteration of Milk in the County

The number of milks submitted under the Food and Drugs Act during the year was 5,294, and of these 198 were reported against ; the amount of adulteration was, therefore, 3·7 per cent. This figure, as will be seen from table 8, is lower than the average for the last 10 years and together with the year 1956 is the second lowest shown in the table.

Table 8
Percentage of Adulteration of Milk Samples, 1950-1959

Year	No. of Samples	No. of Adulterated Samples	Percentage of Adulteration
1950	5,324	285	5·3
1951	5,811	291	5·0
1952	5,804	298	5·1
1953	5,872	281	4·8
1954	5,115	287	5·6
1955	5,637	273	4·8
1956	5,497	203	3·7
1957	5,411	190	3·5
1958	5,385	231	4·3
1959	5,294	198	3·7
Total	55,150	2,537	4·6

The Adulteration of Milk in the County for each month of the year

In table 9 will be found the figures for the number of milk samples submitted by County Sampling Officers during each month of the year together with the number adulterated and the percentage adulteration. In general the percentage adulteration usually increases during late winter and decreases in the autumn. The increasing adulteration of milk noted during the winter and first half of the year may be due to two factors : (a) the poorer quality of milk towards the end of the winter enables cases of slight adulteration to be detected more readily and, (b) the scarcity of milk in the winter may, in some instances, be an incentive to adulteration. The exceptionally high adulteration figure for the month of June, includes 9 adulterated samples obtained from one supplier.

Table 9

Milk.—Monthly Adulteration, 1959

Month	Number of Samples	Number Adulterated	Percentage of Adulteration
January	408	16	3·9
February	420	14	3·3
March	324	12	3·7
April	446	11	2·5
May	396	23	5·8
June	389	33	8·5
July	551	23	4·2
August	465	15	3·2
September	389	10	2·6
October	546	10	1·8
November	581	14	2·4
December	379	17	4·5
Total ...	5,294	198	3·7

In the following table will be found particulars of the various types of adulteration and the number of samples under each heading :—

Table 10

							<i>Per cent.</i>	
Milks deficient in fat only	...	...	...	118	<i>or</i>	2.20		
Milks containing added water only	...	...	...	61	<i>or</i>	1.15		
Milks deficient in fat and containing added								
water	...	...	...	4	<i>or</i>	0.07		
Milks containing foreign matter, etc.	...	...	...	15	<i>or</i>	0.28		
Milks containing preservatives	...	...	...	Nil	<i>or</i>	Nil		
Milks containing colouring matter	...	...	...	Nil	<i>or</i>	Nil		
							198	<i>or</i> 3.70
Milks containing more than 3 per cent added								
water	...	...	...	19	<i>or</i>	0.36		
Milks 10 per cent or more deficient in fat	...	...	...	27	<i>or</i>	0.51		

Alternatively the milk adulteration can be expressed in terms of the adulteration of the various grades of milk as shown in the following table.

Table 11

Grade of Milk	Number of Samples	Number Adulterated	Percentage of Adulteration
Pasteurised	1,272	26	2.04
Tuberculin Tested (Pasteurised)	1,021	14	1.37
Sterilised	568	4	0.70
Tuberculin Tested	1,981	93	4.69
†Raw	452	61	13.49
*Channel Islands (all grades)	265	13	4.90

† Will include raw designated milks not submitted as such.
* The figures for Channel Islands Milks are included here for completeness but for all other purposes in this report they are considered separately as they come under Regulations of their own, see page 34.

It will be noted from table 11 that all the heat treated milks show a lower rate of adulteration than the types of raw milk. This is primarily because heat treated milks are normally bulked before processing and irregularities in individual churns or consignments may thereby be obscured. As against this the high adulteration rate for raw undesig-nated milks is weighted by the selective sampling of a number of milks, taken on delivery to processing dairies, which were the subject of complaint by the dairy managements.

“ Serious ” Milk Adulteration

A study of table 10 reveals that 0·87 per cent. or approximately one-quarter of the total milk adulteration may be considered “ serious.” This figure includes 19 samples which contained added water and 27 samples which were deficient in fat. A number of these seriously adulterated samples were taken informally and could not, therefore, be the subject of prosecutions. In several other instances corresponding appeal-to-cow samples of poor quality were submitted by the Sampling Officers. Prosecutions were recommended, however, in respect of 11 samples.

In table 12 are given details in regard to the adulterated milk samples, submitted by County Sampling Officers, which were the subject of legal proceedings, together with the results of the prosecutions.

Table 12
Milk Prosecutions, 1959

Number of Sample	Nature of Adulteration or Irregularity	Observations
N.472	Deficient 35 per cent. fat.	Section 2 Food and Drugs Act, 1955. Fined £5 and £4.18.0 costs.
C.1431	Deficient 1·6 per cent. fat and 7·8 per cent. solids-not-fat ; freezing point indicated 5·8 per cent. extraneous water.	Section 2 Food and Drugs Act, 1955. Fined £10 and £8.15.0 costs.
S.4126	Deficient 26·6 per cent. fat.	Section 2 Food and Drugs Act, 1955. Fined £5 and £5.19.0 costs.
E.3580	Deficient 9·7 per cent. solids-not-fat ; freezing point indicated 10·0 per cent. extraneous water.	Section 2 Food and Drugs Act, 1955. Fined £10 and £4.18.0 costs.
5012.S	Contained 1 milligram of powdered glass.	Section 2 Food and Drugs Act, 1955. Fined £25 and £12.15.0 costs.
E.4032	Deficient 8·1 per cent. solids-not-fat ; freezing point indicated 13·4 per cent. extraneous water.	Section 2 Food and Drugs Act, 1955. Fined £20 and £7.9.0 costs.
C.2897	Deficient 3·1 per cent. solids-not-fat ; freezing point indicated 2·0 per cent. extraneous water.	Same vendor. Section 32 (3) Food and Drugs Act, 1955. Fined £20 and £12.5.0 costs.
C.2898	Deficient 12·4 per cent. solids-not-fat ; freezing point indicated 9·2 per cent. extraneous water.	
C.2899	Deficient 7·0 per cent. solids-not-fat ; freezing point indicated 2·5 per cent. extraneous water.	
C.2900	Deficient 7·6 per cent. solids-not-fat ; freezing point indicated 5·1 per cent. extraneous water.	
N.1984	Deficient 11·5 per cent. solids-not-fat ; freezing point indicated 11·6 per cent. extraneous water.	Section 2 Food and Drugs Act, 1955. Fined £10 and £9.2.0 costs.

Adulteration of Milk : the County compared with Other Areas

In the following table the percentage of milk adulteration for the year 1959 is given for a number of districts in England whose figures were available at the time of writing. The corresponding figure for the County of Lancaster was 3·7 per cent., as against 4·3 per cent. in the year 1958 and 3·5 per cent. in the year 1957. The percentage of milk adulteration in the County for the year under review is very slightly higher than the average (3·6 per cent.) for the areas included in the table. The rate of adulteration in these districts varied from 10·4 to 0·8 per cent.

Table 13

Milk Adulteration, 1959. Various Districts

Area	Number of Samples	Per cent. of Adult	Area	Number of Samples	Per cent. of Adult
Durham, County ...	1,232	4·4	Leeds	2,474	1·9
Kent, County ...	1,172	3·5	Leicester	1,225	1·2
Somersetshire, County ...	1,435	5·0	Liverpool	2,774	2·5
Staffordshire, County ...	4,169	1·5	Manchester	1,444	6·5
Worcestershire County ...	4,265	10·4	Portsmouth	421	3·3
Birmingham ...	2,881	0·8	Salford	804	3·0

The Standards of Quality for Milk

In some countries there is a definite standard of quality required for liquid milk sold to the public ; it is then illegal to sell milk which is below that standard. In this country the law is less stringent. The present Food and Drugs Act contains no standards for milk. The position remains very much as it was before this Act came into operation, in that the one requirement laid down by law is that milk must be sold to each purchaser in the condition in which it came from the cow. If it attains a certain limit or exceeds it, it is to be regarded as above suspicion, and if it is below that limit it only becomes suspect, and it falls to the lot of the person who sold it to establish, if he can, before the Court that nothing has been added to it, or no ingredient abstracted from it.

In furtherance of the principle outlined in the preceding paragraph, presumptive limits for the composition of milk were established after exhaustive enquiries by a Government Committee appointed by the Board of Agriculture in 1900.

The outcome of the deliberations of this Committee was the production of the Sale of Milk Regulations, 1901, which were modified as regards skimmed milk in 1912. These Regulations were reproduced, in effect unaltered in October 1939, in the Sale of Milk Regulations, 1939, and they have been continued in force by the Food and Drugs Act, 1955. They are as follows :—

(1) Where a sample of milk (not being milk sold as separated, or condensed, milk) contains less than 3 per cent. of milk-fat, it shall be presumed for the purposes of the Food and Drugs Act, 1955, until the contrary is proved, that the milk is not genuine, by reason of the abstraction therefrom of milk-fat, or the addition thereto of water.

(2) Where a sample of milk (not being milk sold as separated, or condensed, milk) contains less than 8·5 per cent. of milk-solids other than milk-fat, it shall be presumed for the purposes of the Food and Drugs Act, 1955, until the contrary is proved, that the milk is not genuine, by reason of the abstraction therefrom of milk-solids other than milk-fat, or the addition thereto of water.

(3) Where a sample of separated milk (not being condensed milk) contains less than 8·7 per cent. of milk-solids other than milk-fat, it shall be presumed for the purposes of the Food and Drugs Act, 1955, until the contrary is proved, that the milk is not genuine, by reason of the abstraction therefrom of milk-solids other than milk-fat, or the addition thereto of water.

Channel Islands Milk and South Devon Milk

In addition to the above standards of quality, which are applicable to all milk, a special standard for milk-fat content of not less than four per cent. was originally prescribed in the Milk (Control and Maximum Prices) (Great Britain) Order, 1947, for “ Channel Islands Milk ” and for “ South Devon Milk.” The enforcement of this standard was the responsibility of the Ministry of Agriculture, Fisheries and Food, but during the year 1956, the Milk and Dairies (Channel Islands and South Devon Milk) Regulations came into operation and made food and drugs authorities responsible for enforcing the standard. “ Channel Islands Milk ” and “ South Devon Milk ” are defined by the Milk (Great Britain) Order, 1959, as being milk (a) which is produced from cows of the Channel Islands or South Devon Breeds and (b) which is labelled “ Channel Islands Milk,” “ Jersey Milk,” “ Guernsey Milk ” or “ South Devon Milk ” when sold in a container. This last Order also prescribes maximum prices for Channel Islands and South Devon Milk. The enforcement of the maximum price is still the responsibility of the Ministry of Agriculture, Fisheries and Food and Food and Drugs authorities are, therefore,

requested to report to the Ministry details of any samples of Channel Islands and South Devon Milk sold at the higher price prescribed which are found to contain less than four per cent. of fat. This is, of course, in addition to any enforcement action in regard to fat deficiency which the Food and Drugs authority may, itself, decide to take. During the year, 1959, 318 samples of Channel Islands Milk were examined (265 were submitted by County Sampling Officers, and 53 by Autonomous Authorities). They were found upon analysis to have an average butter-fat content of 4.72 per cent. and an average solids-not-fat content of 8.99 per cent. Of the 318 samples examined 300 were satisfactory. Of the 18 unsatisfactory samples (13 County) No's N.834, N.893, N.895, C.1999, N.1346, E.3162, N.1494 and E.4343 were found to have butter-fat contents of only 3.60, 3.72, 3.55, 3.65, 3.90, 3.65, 3.80 and 3.48 per cent. respectively. Follow-up samples were taken in each case and were found to be genuine. Sample No. N.1239 was found to have a butter-fat content of only 3.70 per cent. but in this case a follow up sample could not be taken as the producer had ceased to retail Channel Islands Milk. With regard to the remaining County Samples, No. E.3030 had a butter-fat content of 3.75 per cent. and a follow-up sample, No. E.3152, was found to have a butter-fat content of only 3.45 per cent. Legal proceedings were instituted against the supplier who was fined £5 and £12.5.0 costs. Sample No. N.890 was found to have a butter-fat content of only 3.32 per cent. Legal proceedings were instituted against the supplier concerned, who was fined £5 and £5.8.0 costs. Sample No. C.2381 was found to be deficient of 14.2 per cent. solids-not-fat and the freezing point indicated 18.0 per cent. of extraneous water. Legal proceedings against the supplier resulted in him being fined £5 and £3.3.0 costs. Five samples submitted by Autonomous Authorities were found to have butter-fat contents of only 3.50, 3.75, 3.95, 3.35 and 3.90 per cent. respectively. Legal proceedings were instituted by an Autonomous Authority in respect of the sample that contained only 3.35 per cent. butter-fat and the supplier was fined £5 and £5.13.0 costs. Follow-up samples taken in respect of the remaining four samples were found to be genuine.

The Average Composition of Milk during the Year

Genuine milk has not always the same composition. There are natural variations in the amounts of both fat and solids-not-fat in milk as drawn from the cow. It, therefore, becomes a matter not only of interest but also of importance and significance, to know the average values for these two constituents. This information is given for the year 1959 in table 14, where it will be seen that the average figure for fat is 3.62 per cent., for solids-not-fat 8.62 per cent. and for total solids 12.24 per cent.

It should be pointed out that the average compositions and frequencies included in this section of the Report are calculated from the results of all the samples of milk (other than Channel Islands milk) received ; that is to say, there are included all adulterated samples and further, all appeal-to-cow samples, whether they were above or below the limits for fat and solids-not-fat laid down by the Sale of Milk Regulations. The figures for average composition calculated on this basis will, therefore, tend to be somewhat lower than those for genuine milk sold in the County.

Table 14
Average Composition of Milk, 1959

Month	Number of Samples*	Fat per cent.	Solids-not-fat per cent.	Total Solids per cent.
January ...	407	3·63	8·48	12·11
February ...	1,163 { 423	3·58 { 3·56	8·53 { 8·55	12·11 { 12·11
March ...	333	3·53	8·57	12·10
April ...	446	3·59	8·59	12·18
May ...	1,228 { 395	3·50 { 3·45	8·64 { 8·67	12·14 { 12·12
June ...	387	3·44	8·68	12·12
July ...	551	3·54	8·62	12·16
August ...	1,405 { 463	3·59 { 3·57	8·63 { 8·63	12·22 { 12·20
September ...	391	3·66	8·65	12·31
October ...	546	3·84	8·68	12·52
November ...	1,508 { 583	3·80 { 3·84	8·66 { 8·67	12·46 { 12·51
December ...	379	3·70	8·62	12·32
Whole year ...	5,304	3·62	8·62	12·24

* Includes Appeal-to-Cow samples but does not include Channel Islands milk and eight samples of Milk examined for foreign matter only.

The Average Composition of Milk for each Month of the Year

Table 14 also includes the figures for the averages of fat and solids-not-fat for each month of the year. As regards fat it will be seen that June has the lowest figure, 3·44 per cent., and October and November the highest, 3·84 per cent. In respect of solids-not-fat, the lowest figure was obtained in January, 8·48 per cent., the highest in June and October, the figure then being 8·68 per cent. These variations, particularly in respect of fat content, have been the general experience for many years, the fat content usually being at its lowest in the spring and at its highest in the autumn. Solids-not-fat tend to be lower in the winter.

The Average Composition of Morning and Evening Milk during the Year

Usually, when samples are submitted, the information is given whether they are morning or evening milks. It has, therefore, been possible to classify them so as to show the average composition of morning and evening milks separately.

When cows are milked at the usual intervals the evening milk, due to the shorter interval, is richer in fat than the morning milk, while there is little if any difference as a rule in solids-not-fat. This is illustrated in table 15 below, where the average fat for morning milk is 3.55 per cent., and the evening fat 3.89 per cent.; the fat in the evening milk being greater by 0.34 per cent., while the averages for solids-not-fat are very similar for the morning and evening milk.

Table 15
The Average Composition of Morning and Evening Milk
during the Year

	Number of Samples*	Fat per cent.	Solids-not-fat per cent.	Total solids per cent.
Morning Milk ...	1,214	3.55	8.63	12.18
Evening Milk ...	714	3.89	8.65	12.54
Mixed Milk ...	112	3.50	8.51	12.01
Unknown ...	3,264	3.60	8.61	12.21
Total ...	5,304	3.62	8.62	12.24

* Includes Appeal-to-Cow samples but does not include Channel Islands milk and Eight samples of Milk examined for foreign matter only.

The Average Composition of Milk : compared with past years

In table 16 the average composition of all the milks examined is set out for the period 1910-1959. It will be seen that the average figure for fat does not vary greatly from year to year although the figure for the year under review is the lowest of any shown in the table. In respect of solids-not-fat there is very little difference in the averages for the years 1910-1940. Since 1940, however, it will be noted there is an appreciable decrease in solids-not-fat, the lowest figure of 8.55 per cent. being obtained in the year 1943. The average for solids-not-fat for the year under review was 8.62 per cent. In addition to other possible causes for this decrease it should be remembered that seven of the 19 years during which the average solids-not-fat have been lower than formerly were years which showed a high rate of adulteration. Since the year 1943 there has been, in general, a tendency for solids-not-fat to show an upward trend but they are still appreciably below the pre-war figures.

Table 16
Average Composition of Milk, 1910-1959

Year	Number of Samples	Fat per cent.	Solids-not-fat per cent.	Total Solids per cent.
1910 to 1930 ...	56,028	3·67	8·90	12·57
1931	3,090	3·84	8·81	12·65
1932	3,205	3·77	8·85	12·62
1933	3,060	3·76	8·82	12·58
1934	3,310	3·74	8·81	12·55
1935	3,422	3·75	8·84	12·59
1936	3,098	3·73	8·88	12·61
1937	3,278	3·74	8·84	12·58
1938	3,398	3·70	8·78	12·48
1939	3,128	3·67	8·78	12·45
1940	2,144	3·70	8·79	12·49
1941	1,866	3·70	8·64	12·34
1942	1,516	3·75	8·66	12·41
1943	1,489	3·70	8·55	12·25
1944	1,197	3·69	8·57	12·26
1945	1,096	3·72	8·57	12·29
1946	2,776	3·75	8·58	12·33
1947	4,625	3·75	8·63	12·38
1948	4,523	3·67	8·64	12·31
1949	5,210	3·66	8·65	12·31
1950	5,362	3·68	8·67	12·35
1951	5,839	3·67	8·65	12·32
1952	5,844	3·67	8·68	12·35
1953	5,922	3·68	8·68	12·36
1954	5,182	3·71	8·65	12·36
1955	5,686	3·68	8·66	12·34
1956	5,524	3·71	8·59	12·30
1957	5,485	3·68	8·63	12·31
1958	5,439	3·68	8·63	12·31
1959	5,304	3·62	8·62	12·24
1910 to 1959 ...	167,046*	3·71	8·81	12·52

* Does not include Channel Islands milk and 12 samples of Milk examined for foreign matter only.

Composition of Milk : the County compared with Other Areas

In table 17 below, figures are given for the composition of milk during the year 1959 in the areas of 12 other Food and Drugs Authorities. The corresponding figures for the County of Lancaster, based upon 5,304 samples of milk are fat 3·62 per cent., solids-not-fat 8·62 per cent., and total solids 12·24 per cent. It will be noted that the Lancashire figures for both fat and solids-not-fat are very slightly below the average results for the other areas listed, *viz.*, fat 3·64 per cent. and solids-not-fat 8·68 per cent.

Table 17

Composition of Milk, 1959. Various Districts

Area	Number of Samples	Fat per cent.	Solids- not-fat per cent.	Total Solids per cent.
Durham, County ...	1,305	3·64	8·60	12·24
Kent, County	1,172	3·60	8·70	12·30
Somersetshire, County ...	1,472	3·60	8·70	12·30
Staffordshire, County ...	4,206	3·70	8·65	12·35
Worcestershire, County	4,290	3·66	8·73	12·39
Birmingham	2,885	3·63	8·74	12·37
Leeds	2,492	3·69	8·72	12·41
Leicester	1,225	3·69	8·68	12·37
Liverpool	2,774	3·68	8·70	12·38
Manchester	1,444	3·54	8·71	12·25
Portsmouth	421	3·77	8·64	12·41
Salford	809	3·53	8·62	12·15

The Composition of Milk : Frequencies

The 5,304 samples of milk examined for chemical composition during the year have been arranged in table 18 to show the number of samples having the same percentage of fat, or, in other words, the frequency with which each percentage of fat, differing by 0·1 per cent., occurred. The table has been shortened by placing in separate groups all samples containing less than 2·5 per cent. and above 3·9 per cent. This information is given for the whole year and for each month of the year.

This table gives different information than do figures for averages. It shows that, as in previous years, there are comparatively few samples below 3·0 per cent. It also shows how the figures from which the averages are calculated are distributed, information which is not obtainable from the figures for averages alone.

In this table, and the following one, table 19, all samples of milk are included, whether adulterated or not, and also all appeal-to-cow samples.

Table 18
Composition of Milk : Frequencies
Fat

Per cent.	Number of Samples												
	Jan.	Feb.	Mar.	Apl.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Under 2·5	0	1	3	0	1	1	2	0	0	0	1	0	9
2·5	1	0	3	0	0	0	0	1	0	0	0	0	5
2·6	0	0	1	1	0	1	1	2	1	0	0	0	7
2·7	1	4	3	2	2	6	2	2	1	0	0	0	23
2·8	1	3	2	3	6	10	3	2	1	1	2	2	36
2·9	5	4	2	2	12	7	6	1	0	0	1	6	46
3·0	4	14	10	10	23	15	20	15	6	1	6	5	129
3·1	11	21	7	17	18	21	19	10	9	7	3	10	153
3·2	13	21	17	32	42	42	18	21	16	5	4	18	249
3·3	29	25	35	50	81	66	44	23	12	11	11	15	402
3·4	40	65	80	71	70	78	99	67	25	21	14	8	638
3·5	72	106	75	104	49	57	138	122	69	23	34	43	892
3·6	92	63	19	36	27	23	79	103	102	68	49	93	754
3·7	46	28	20	24	8	12	48	24	53	113	155	62	593
3·8	25	16	12	17	11	7	12	13	22	110	105	44	394
3·9	18	7	5	8	5	7	8	6	8	56	55	18	201
4·0 and Over	49	45	39	69	40	34	52	51	66	130	143	55	773
Totals	407	423	333	446	395	387	551	463	391	546	583	379	5,304

Table 19 gives the frequencies for solids-not-fat. It has already been stated that the average figure for solids-not-fat for the year was 8.62 per cent., and the bulk of the individual figures for solids-not-fat are arranged closely around the average. Tables 18 and 19 bring out the further point that a much higher proportion of milks fall below the presumptive limit of 8.5 per cent. for solids-not-fat than fall below the presumptive limit of 3.0 per cent. for milk-fat.

Table 19
Composition of Milk : Frequencies
Solids-not-Fat

Per cent.	Number of Samples												
	Jan.	Feb.	Mar.	Apl.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Under 7.8	0	0	0	0	1	0	0	0	3	2	3	1	10
7.8	0	1	0	1	0	0	0	0	0	1	2	1	6
7.9	1	0	0	2	1	0	1	0	0	1	1	1	8
8.0	4	3	0	0	1	0	1	1	2	0	0	0	12
8.1	8	5	2	2	0	1	3	2	1	0	1	3	28
8.2	20	8	7	3	1	2	1	3	8	3	6	5	67
8.3	36	26	13	20	5	7	13	4	8	5	9	7	153
8.4	113	60	38	61	19	17	41	40	18	15	22	17	461
8.5	135	168	127	134	52	46	147	138	65	85	105	85	1,287
8.6	60	88	80	116	133	134	159	110	108	152	154	152	1,446
8.7	21	23	40	55	99	104	98	94	91	172	157	66	1,020
8.8	5	19	19	25	49	39	54	46	56	72	74	28	486
8.9	1	16	5	14	19	21	25	15	23	24	31	8	202
9.0 and over	3	6	2	13	15	16	8	10	8	14	18	5	118
Totals	407	423	333	446	395	387	551	463	391	546	583	379	5,304

Samples of Milk taken for Comparison

Part II of the Seventh Schedule of the Food and Drugs Act, 1955, contains certain provisions relating to the procuring of comparison samples of milk. Briefly, when a sample of milk is obtained from a vendor he must, if so requested, give to the Sampling Officer the name and address of the person from whom he, in turn, received the milk. The vendor may also within 60 hours of the sample being taken, serve on the

Food and Drugs Authority a notice stating the name and address of the person from whom he received the milk and the time and place of delivery to himself of milk from a corresponding milking, and requesting the Authority to procure, as soon as practicable, a sample of milk from a corresponding milking in course of transit or delivery to himself. The vendor shall have no right to request such a sample if the original sample procured from him was a mixture of milk produced on more than one dairy farm. In turn, the dairyman from whom such a sample of milk is procured in course of transit or delivery, may, within 60 hours after the sample was procured, serve on the Authority concerned a notice requesting that immediate steps be taken to procure a sample of milk from a corresponding milking of the cows. The person procuring this last sample shall be empowered to take such steps at the dairy as may be necessary to satisfy him that the sample is a fair sample of the milk of the cows when properly and fully milked. It is the practice in the County for the Sampling Officers to take, in appropriate cases, follow-up and appeal-to-cow samples without a formal request being made by the vendor.

Appeal-to-Cow Samples

Appeal-to-cow samples, or, as they are sometimes called, "byre" samples, if the method of taking them is properly carried out in every detail, may be regarded in the light of a final appeal. The milking must be carefully supervised, it must be established that the same cows are milked, that it is the corresponding milking and the dairy equipment must be inspected to see that it is clean and dry. The results of analyses of samples procured in this way must be accepted as those pertaining to genuine milk. Appeal-to-cow samples serve at least two purposes. In the first place, they show, in cases where an unsatisfactory sample has been sold, the quality of the unadulterated milk given by the cows, and, secondly, extend our knowledge of the quality of the milk of different herds and of the natural variations which may occur in the composition of genuine milk.

It was with the former object in view that the practice of taking appeal-to-cow samples was instituted, *viz.*, to ascertain the composition of the milk given by the cows. It is now generally admitted that the composition of the milk from a herd of cows may occasionally fall below the limits laid down in the Sale of Milk Regulations, particularly at the morning milking. When such a milk is examined the question arises whether it is an unadulterated milk of poor quality, or a milk of normal composition which has been tampered with; the appeal-to-cow sample is intended to help to solve this problem.

In table 20, there is given a list of appeal-to-cow samples, submitted by County Sampling Officers during the year 1959, and also the results of analysis. Eighteen such samples are included, representing seven herds, the number of cows in the herds varying from five to 33.

In addition three appeal-to-cow samples were examined for autonomous authorities.

Analysis of Appeal-to-Cow Samples of Milk
Table 20

Number	Number of cows milked	Approx. yield gallons	Morning or Evening	Fat per cent.	Solids-not-fat per cent.	Freezing Point (Hortvet) °C	Taken for comparison with numbers	Observations
493 } 494 }	7 9	5 11	M	3.68 3.25	8.86 8.73	—0.535 —0.537	N.472	
583	5	5	M	3.65	8.31	—0.539	C.1431	Low in solids-not-fat.
S.3494 } S.3495 } S.3496 } S.3497 }	6 4 4 2	13 10½ 9 5	M	2.30 2.50 2.80 2.40	8.30 8.28 8.28 8.10	—0.542 —0.545 —0.544 —0.547	S.3488	Poor in fat and low in solids-not-fat. Poor in fat and low in solids-not-fat. Poor in fat and low in solids-not-fat. Poor in fat and low in solids-not-fat.
495 } 496 } 497 } 498 } 499 }	15	12 3 2½ 3 2	M	3.70 4.05 3.00 3.55 3.35	8.86 8.50 8.38 8.81 8.27	—0.538 —0.538 —0.535 —0.545 —0.530	N.708	Low in solids-not-fat. Low in solids-not-fat.
1051	5	7	M	3.05	8.81	—0.542	N.1418	
954 } 955 }	11 14	7 9	E	4.17 4.12	8.74 8.79	—0.542 —0.542	E.358	
584 } 585 } 586 }	33	11 Milking Unit half-full	M	3.95 3.60 4.20	8.25 8.84 7.58	—0.539 —0.546 —0.542	C.2897 and C.2898	Low in solids-not-fat. Low in solids-not-fat.

An inspection of table 20 shows that the freezing point depression of the appeal-to-cow samples was determined in every case, and this gave valuable evidence of the authenticity of the samples. Although a number of the appeal-to-cow samples were naturally poor in solids-not-fat, in no such instance was the freezing point of the sample above -0.530°C (Hortvet), the figure which is usually accepted as the highest freezing point normally given by milk free from extraneous water. The freezing point of the 18 appeal-to-cow samples varied between -0.530°C (Hortvet) to -0.547°C (Hortvet); the average figure being -0.540°C (Hortvet). The average freezing points of appeal-to-cow samples examined during the five years 1954 to 1958 inclusive were -0.539°C ., -0.539°C ., -0.539°C and -0.546°C ., 540°C .

Milk Supplied to Schools, Day Nurseries, Children's Homes and Hostels for the Aged

The 305 samples of milk marked " Private " in table 3 were taken from consignments delivered to Schools, Day Nurseries, Children's Homes and Hostels for the Aged in the County. Seventeen of these samples were adulterated, corresponding to an adulteration rate of 5.6 per cent. This figure is higher than the total milk adulteration for the County which was 3.7 per cent.

Of the 305 samples, 281 were taken at Schools. Sixteen of these were found to be adulterated or otherwise unsatisfactory. Repeat samples taken in respect of four of these samples were found to be genuine. Three other samples were found to be very slightly deficient in fat and the respective vendors were notified. The remaining nine samples were found to contain the following insects or extraneous matter : dead ground beetle, dead blow-fly, fragment of broken glass, fragment of green pencil point, small fragments of chalk, bird dropping, fungus, atmospheric dust and one sample was found to contain a small amount of copper. The School authorities were informed with regard to the samples containing a fragment of green pencil point and the small fragments of chalk. Both the School authorities and the dairy concerned were interviewed with regard to the sample containing a bird dropping. The dairies supplying the six other samples containing insects or extraneous matter were cautioned.

Eleven samples were taken at Day Nurseries and five samples at Children's Homes. All these samples were found to be satisfactory.

Eight samples were taken at Hostels for the Aged and of these one sample was found to be deficient in fat but a follow-up sample was found to be satisfactory.

Samples of Milk deficient in solids-not-fat but genuine

Attention has already been drawn in the sections of this Report dealing with the "Standards of quality for milk," "Composition of Milk : Frequencies" and "appeal-to-cow" samples, to the fact that milk as it comes from the cow is not always of such quality as to comply with the minimum presumptive limits of 3·0 per cent. for milk-fat and 8·5 per cent. for solids-not-fat, of the Sale of Milk Regulations, 1939. In order to decide whether such samples submitted under the Food and Drugs Act were in fact as given by the cow, and therefore, genuine, it is still necessary in the case of presumed fat deficiencies to make an actual comparison with an "appeal-to-cow" sample from a corresponding milking. Formerly, this was also the only means by which it could be decided whether a sample low in solids-not-fat was of naturally poor quality or whether it had been adulterated by the addition of water. For the past 30 years or so, however, it has been possible by submitting the sample to the Hortvet freezing point test for the Analyst to obtain additional evidence that a deficiency in solids-not-fat was due to the presence of extraneous water or, alternatively, that it was due to natural causes.

In the section of the revised Ministry of Health memorandum 36/Foods (1939), dealing with Public Analysts' quarterly reports, it is laid down that in the case of samples below the presumptive limits of the Sale of Milk Regulations, the report should show whether they were adjudged genuine by the Analyst on other grounds. It is now the normal procedure to submit all samples low in solids-not-fat to the Hortvet freezing point test and to include in the quarterly reports a table giving details of such samples which satisfactorily pass the test.

During the year under review, 678 County samples of milk were found to be poor in solids-not-fat, but were adjudged genuine by the Hortvet freezing point test. This figure corresponds to 12·8 per cent. of the total milk samples (including "appeal-to-cow") submitted by County Sampling Officers. These poor quality milks were distributed over the year as follows :—334 in the March quarter, 133 in the June quarter, 130 in the September quarter and 81 in the December quarter. The samples were not, therefore, confined, to any particular season of the year, although the greatest number was obtained towards the end of the winter and the lowest in the late autumn. The lowest figure for solids-not-fat shown by any of these samples was 7·30 per cent., the next lowest being 7·58 per cent.

Each year it is usual to find an appreciable number of milk samples which are poor in solids-not-fat but are nevertheless adjudged genuine as the result of applying the Hortvet freezing point test. The number of such samples, *viz.*, 12·8 per cent., submitted during the year under review is higher by 2·5 per cent. than for the year 1958, when the figure was 10·3 per cent. In the five years preceding the year 1958 the percentage of milk samples coming under this heading varied from 4·3 to 11·2 per cent.

It will be noted that the percentage of milk samples poor in solids-not-fat but genuine by the freezing point test for the year 1959, *viz.*, 12·8 per cent. is also proportionately very high when compared with the percentage of adulterated milk samples for the same year, *viz.*, 3·7 per cent. The difference is even more striking when it is considered that the last mentioned figure includes all samples containing extraneous water and all samples containing less than 3·0 per cent. milk fat whether or not, in the latter instance, the corresponding appeal-to-cow samples indicated that the fat deficiencies were actually due to abstraction or merely to natural causes.

The relatively high proportion of milks found to be naturally deficient in solids-not-fat, which is by no means confined to Lancashire, is undoubtedly one of the factors which influenced the Government to appoint a Committee in the year 1958 to consider the Composition of Milk.

Adulteration of Articles other than Milk

During the year under review there were examined for the County 2,962 samples other than milk ; of these 175 were reported against, which corresponds to an adulteration rate of 5·9 per cent., which is lower than the figure obtained in the year 1958, when it was 6·1 per cent. The percentage of adulteration in articles other than milk for the year under review, was much higher than that for milk, *viz.*, 3·7 per cent. An examination of tables 3 and 21 shows that the commodities which had a relatively high proportion of unsatisfactory samples, and, therefore, contributed especially to the overall adulteration rate, included flour, sausages, samples containing extraneous matter and samples whose labels did not conform to the requirements of the Labelling of Food Order.

Table 21 gives a list of the articles other than milk submitted by County Sampling Officers which were found to be unsatisfactory with particulars of the type of adulteration and the action taken.

Table 21

Samples, other than Milk, Adulterated or otherwise giving rise to Irregularity

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
E.2587	Soda Bread Mix	Informal	No list of ingredients on label.	Packers agreed to alter label.
S.9619	Part of Steak and Kidney Pie	Informal	Inner pastry of pie next to gravy discoloured pale green with a permitted dye (Green S).	Manufacturers of colouring matter agreed to increase the size of lettering indicating that it should not be used in the making of meat pies.
S.3009	Bread	Informal	Butter or milk solids not detected yet the word butter included in the description.	Bakers communicated with.
E.2554	Flour	Informal	Creta praeparata only 210 milligrammes per 100 grammes. Flour (Composition) Regulations, 1956, require 235 - 390 milligrammes creta praeparata per 100 grammes.	Millers undertook to take steps to obtain a correct mixing in future.
E.2557	Flour	Informal	Creta praeparata 415 milligrammes per 100 grammes. Flour (Composition) Regulations, 1956, require 235-390 milligrammes creta praeparata per 100 grammes.	No action advised.
E.2560	Flour	Informal	Creta praeparata only 72 milligrammes per 100 grammes. Flour (Composition) Regulations, 1956, require 235 - 390 milligrammes creta praeparata per 100 grammes.	Millers undertook to take steps to obtain a correct mixing in future.
C.1170	Coffee and Chicory Essence Liquid, sweetened	Informal	Caffeine 0.23 per cent. w/v should be not less than 0.25 per cent. w/v.	No action advised.
N.314	Pork Sausage	Informal	Contained 280 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor interviewed.
S.3048	Suet, Shredded	Informal	Fat content 82.4 per cent. Should be not less than 83 per cent.	No action advised.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
E.2603	Flour	Informal	Creta praeparata 415 milligrammes per 100 grammes. Flour (Composition) Regulations, 1956, require 235-390 milligrammes creta praeparata per 100 grammes.	No action advised.
E.2606	Flour	Informal	Contained 0.17 milligram per 100 grammes of Vitamin B ₁ and 1.55 milligrammes per 100 grammes of Iron. Minimum limits of the Flour (Composition) Regulations, 1956, are 0.24 milligram per 100 grammes and 1.65 milligrammes per 100 grammes respectively.	Millers agreed to increase the amount of synthetic Vitamins and Iron in the master mix.
C.1205	Compound Syrup of Hypophosphites B.P.C.	Informal	Sample was not Syrup of Hypophosphites B.P.C. and was devoid of Hypophosphites, Quinine and Sugar.	No further stock available.
N.395	Orange Drink	Informal	No name of food and no vendor's name or address on bottle.	Packers interviewed.
N.413	Beef Sausage	Informal	Contained 155 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor interviewed.
N.425	Camphorated Oil	Informal	Contained 18.9 per cent. camphor. Minimum B.P. limit is 19 per cent. camphor.	No action advised.
E.2671	Parrish's Chemical Food	Informal	Should be labelled "Chemical Food B.P. 1948" or "Chemical Food B.P.C." Forty per cent. of the iron present had become insoluble.	Old stock. Remainder of stock withdrawn from sale.
E.774	Part of Fruit Cake with foreign substance	Informal	Contained five pieces of dung weighing in all 1.29 grammes.	Section 2 Food and Drugs Act 1955. Discharged on payment of £20.6.0 costs.
C.1332	Distilled Witch Hazel B.P.C.	Informal	Aqua Hamamelidis deleted from current B.P.C. Should be labelled "B.P.C. 1949."	Vendor notified.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
N.444	Camphorated Oil B.P.	Informal	Contained artificial colouring matter. This is not official in Camphorated Oil B.P.	Manufacturers agreed to cease using artificial colouring matter.
E.775	End crust slice of White Bread containing foreign matter	Informal	Crust contained a piece of white cotton cloth impregnated with purified mineral oil weighing in all 1.24 grammes.	Bakers cautioned.
S.3395	Pork Sausages	Informal	Contained 225 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor interviewed.
S.3400	B.P. Glycerin and Borax	Informal	No longer in B.P., should be labelled B.P.C. Contained 3.9 per cent. extraneous moisture.	Remainder of stock destroyed and attention of manufacturers drawn to incorrect label.
E.776	Part tin of Pork Luncheon Meat with foreign object	Informal	Contained a scarred piece of steel weighing 2.1 grammes.	Importers communicated with.
E.777	Part of a Custard Tart containing foreign matter	Informal	Contained partially smoked tobacco and fragments of paper weighing in all 0.8 gramme.	Section 2 Food and Drugs Act, 1955. Fined £20 and £5.10.0 costs.
C.1566	Rose Hip Syrup	Informal	Labelling of Food Order requires declaration of Vitamin C in milligrammes per fluid ounce (not per 100 mls.).	Packers communicated with.
C.1575	Yoghourt (made from Goat's milk)	Informal	Fat-free dry matter only 8.0 per cent. Consisted of and should be labelled "Yoghourt Milk."	Packers communicated with.
N.690	Flour, plain	Informal	Creta praeparata only 92 milligrammes per 100 grammes. Flour (Composition) Regulations, 1956, require 235 - 390 milligrammes creta praeparata per 100 grammes.	Millers communicated with.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
E.778	A piece of bovine oesophagus containing foreign matter	Informal	Contained divided and partly digested cereal and grass fragments weighing in all 4.5 grammes.	Section 2 Food and Drugs Act 1955. Fined £20 and £7 costs.
—	Cheese Spread, Celery	Informal	Contained 106 milligrammes of phosphate crystals due to crystallising out of emulsifying salts. Otherwise genuine.	No action advised.
E.779	Cheese and Bacon Spread	Informal	Contained 129 milligrammes of phosphate crystals due to crystallising out of emulsifying salts. Otherwise genuine.	No action advised.
C.1636	Steaklets, Frozen	Informal	Meat content only 89.5 per cent.	No action advised.
T.P.2	Bread, Part of a sliced loaf	Informal	Contained 0.97 gramme of twisted cotton, of the nature of string, mixed with finely divided iron and iron oxide.	Bakers cautioned.
N.759	Bread	Informal	Butter or milk solids not detected although wrapper would appear to suggest the presence of butter.	Manufacturers taking steps to alter label.
S.3604	Pork Sausages	Informal	Meat content 64.0 per cent.	Slightly poor in meat content.
C.1661	Dandelion Coffee Essence	Informal	Contained 120 parts per million of zinc. Recommended limit 50 parts per million.	Packers took steps to investigate the cause of the presence of excess zinc.
N.768	Iodine Paint	Informal	Contained 4.28 per cent. Iodine and 3.65 per cent. Potassium Iodide. Bottle only part full when received.	Vendor communicated with.
S.3617	Sago	Informal	Consisted of Tapioca.	Vendor interviewed.
C.1712	Paraffin Liquid	Informal	Sample did not comply with the B.P. limit tests for carbonisable substances and sulphur compounds.	No further stock available. Same manufacturers as sample S.3981.
C.1711	Butter Drops	Informal	Sweets individually wrapped in papers bearing a list of ingredients appropriate to fruit drops. Otherwise genuine.	Manufacturers notified.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
C.1717	Steaklets, Frozen	Informal	Meat content only 84·5 per cent.	No action advised.
N.834	Channel Islands Milk	Informal	Deficient 10 per cent. fat.	Further sample genuine.
S.9620	Portion of Sliced Loaf of Bread	Informal	Contained 0·28 gramme of bread discoloured with 2·4 per cent. iron oxide.	Bakers cautioned.
C.1745	Sherbet	Informal	Cornflour should follow "Sugar" in list of ingredients and calcium phosphate present without declaration.	Packers discontinuing use of label.
C.1786	Fruit Salad, canned	Informal	List of ingredients in wrong order. Apricots should be first in list, peaches third and cherries last.	Packers communicated with.
N.890	Channel Islands Milk	Formal	Deficient 17 per cent. fat.	Food and Drugs Act, 1955. Section 113. Fined £5 and £5.8.0 costs.
N.875	Liquid Paraffin	Informal	Sample did not comply with the B.P. limit test for carbonisable substances.	Stock withdrawn from sale.
N.893	Channel Islands Milk	Formal	Deficient 7 per cent. fat.	Same vendor. Producer cautioned. Further sample genuine.
N.895	Channel Islands Milk	Formal	Deficient 11·2 per cent. fat.	
T.P.3	Sliced Loaf of Bread	Informal	Contained 92 milligrammes of discoloured dough containing 5·5 milligrammes of used Oil and 0·5 milligram of Iron.	Bakers communicated with.
S.3801	Ice Lollies	Informal	"Vegetable fat" should follow "Non-fat-milk-solids" instead of heading list of ingredients.	Same manufacturer as C.1993. Correct labels now in use.
C.1855	Fruit Salad, canned	Informal	Ingredients listed in wrong order—Pineapple in excess of Apricots.	No action advised.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
S.3799	Ice Lollies	Informal	Sample consisted of a chocolate flavoured ice-cream lolly with ice-cream as the main ingredient. List of ingredients in wrong order and incomplete.	Manufacturers communicated with.
S.9621	Sliced Bread	Informal	Contained 0.12 gramme of dough containing 5 milligrammes of mineral oil and 19 milligrammes of iron together with a few wool fibres.	Bakers communicated with.
S.9622	Opened Can of Corned Beef	Informal	Contained a 1½ in. length of corroded iron weighing 0.19 gramme.	Importers communicated with.
C.1913	Glycerin B.P.	Informal	Contained 0.9 per cent. excess water.	Packers no longer in business.
N.1031	Health Salts	Informal	Appearance of old stock. Sample caked and 75 per cent. of the sodium bicarbonate content had decomposed.	Remainder of stock surrendered to local authority.
S.3910	Soluble Aspirin Tablets	Informal	Contained 4.5 grains Aspirin per tablet. Should contain 5 grains Aspirin per tablet.	Further sample from same stock genuine.
N.1083	Beef Sausages	Informal	Contained 110 parts per million sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor interviewed.
E.2751	Pork Sausages	Informal	Contained two fragments of wood each approximately 0.2 x 0.1 inch and weighing in all 8 milligrammes.	Manufacturers cautioned.
C.1978	Tincture of Iodine, B.P.	Informal	Contained Iodine 3.38 per cent. and Potassium Iodide 3.40 per cent. B.P. maximum limits 2.7 per cent. of each.	Remainder of stock withdrawn from sale and destroyed.
C.1979	Glycerin	Informal	Contained 0.5 per cent. excess water.	No action advised.
C.1993	Ice Lollies	Informal	Less vegetable fat present than sugar or non-fat-milk-solids and should therefore follow these in list of ingredients. No wheat starch detected although declared.	Same manufacturers as S.3801. Correct labels now in use.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
C.1999	Channel Islands Milk	Formal	Deficient 8·7 per cent. milk fat.	Farmer cautioned. Further sample genuine.
S.3981	Liquid Paraffin	Informal	Sample did not comply with the B.P. limit test for carbonisable substances and sulphur compounds.	Same manufacturers as C.1712. No further stock available.
C.2028	Glycerin	Informal	Contained 0·1 per cent. excess water.	No action advised.
E.2752	Part packet of Potato Crisps containing foreign object	Informal	Contained a dead cockroach weighing 0·18 gramme.	Packers interviewed.
C.2027	Fruit Juice, bottled	Informal	Grape Juice should precede Guava Juice in both declared list of quantities and in list of ingredients.	Packers agreed to alter label.
S.9623	Pieces of Baton Loaf	Informal	Contained a piece of white cotton string $2\frac{1}{2}$ in. long and weighing 0·15 gramme.	Baker cautioned.
E.2828	Junior Aspirin Tablets	Informal	The declared ingredient di-calcium phosphate omitted from tablets.	Correct labels now in use.
N.1180	Fruit Salad, canned	Informal	Pears and Apricots present in greater quantity than Peaches which are listed first in statement of ingredients.	No action advised.
E.3006	Mixed Dried Fruit	Informal	Ingredients listed in wrong order. Apricots in excess of pears.	No action advised.
E.3030	Jersey Milk	Formal	Deficient 6·2 per cent. fat.	Farmer cautioned. See Sample No. E.3152.
N.1239	Channel Islands Milk	Formal	Deficient 7·5 per cent. fat.	Farmer cautioned. Ceased to retail Channel Islands milk.
E.3087	Portion of a Meat Pie	Informal	Contained a piece of broken glass weighing 0·325 gramme. Piece of glass was loose with the sample. No further glass was found in the portion of meat pie.	Complainant notified.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
E.2928	One slice of Bread containing foreign object and the remaining portion of a sliced loaf	Informal	Contained a galvanised iron staple approximately one-half inch long, weighing 0.40 gramme.	Bakers cautioned.
M.8153	Portion of Pork Sausage with Baked Beans, canned	Informal	Contained two fragments of vegetable matter weighing in all 1.07 grammes. The foreign matter had the appearance of short pieces of cooked and partially disintegrated plant stem.	Packers communicated with.
E.2755	Opened part tin of Pork Luncheon Meat containing foreign body	Informal	Contained a dead wasp weighing 0.11 gramme.	Packers cautioned.
E.2756	Part filled bottle of soft drink containing foreign matter	Informal	Contained films of fungus hyphae and spores with particles of soot, silicious matter, etc., weighing in all 10 milligrammes.	Manufacturers undertook to take every precaution to prevent a recurrence.
C.2139	Vitamin Tablets	Informal	Vitamin C content declared and amount given in printed formula not identical.	Manufacturers communicated with.
N.1346	Channel Islands Milk	Formal	Deficient 2.5 per cent. fat.	Vendor cautioned. See No. N.1494.
N.1357	Boric Lint	Informal	Contained only 2.2 per cent. boric acid. B.P.C. limits 3.0—7.0 per cent. boric acid.	Manufacturers communicated with. Same manufacturers as No.1366.
N.1366	Boric Lint	Informal	Contained only 2.65 per cent. boric acid.	Manufacturers communicated with. Same manufacturers as N.1357.
E.3152	Jersey Milk	Formal	Deficient 13.7 per cent. fat.	Regulation 4 of The Milk & Dairies (Channel Islands & South Devon Milk) Regulations, 1956. Fined £5 and £12.5.0 costs. See also Sample No. E.3030.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
E.3162	Channel Islands Milk	Formal	Deficient 8·7 per cent. fat.	Farmer cautioned. Further sample genuine.
N.1445	Treacle	Informal	Contained 21 parts per million copper. Recommended limit for copper 20 parts per million.	No action advised.
N.1494	Channel Islands Milk	Informal	Deficient 5 per cent. fat.	Vendor interviewed. Further sample genuine. See also Sample N.1346.
E.3251	Brown Flour	Informal	Contained 460 milligrammes creta praeparata per 100 grammes flour. Limits are 235-390 milligrammes per 100 grammes.	Millers communicated with.
E.3276	Shelled Walnuts	Informal	Acid value of extracted oil 7·8.	No action advised.
S.4419	Part bottle of Lemonade	Informal	Contained 0·7 part per million by weight of sulphuretted hydrogen liberated from the black composition stopper.	Referred to Food & Drugs Authority of Manufacturer's area.
C.2306	Minced Chicken in Jelly	Informal	Chicken content 67 per cent. Should be not less than 70 per cent.	No further stock available.
C.2313	Lemon Cheese	Informal	No declaration of weight on container.	Weights & Measures Inspector informed.
E.3292	Lemon Cheese	Informal	No name of food or name and address of packer on a label. No declaration of net weight.	Vendor interviewed.
E.2758	Loose Coffee containing foreign objects	Informal	Contained one dead adult cockroach, one dead young cockroach, one piece of dried-out raw ham or bacon weighing 0·55 gramme and eight cat hairs.	Purchaser and Shopkeeper interviewed.
C.2348	Cream Cheese	Informal	Contained 18·6 per cent. milk fat and 60·4 per cent. moisture. Consisted of sour milk curd cheese and not cream cheese.	Vendor interviewed.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
C.2356	Double Cream	Informal	Fat content only 47 per cent. Standard is not less than 48 per cent.	Vendor interviewed. Further sample genuine.
N.1526	Cream Cheese	Informal	Fat 34.3 per cent. Moisture 53.1 per cent. Should be described as "Soft Cheese" or "Processed Cream Cheese."	Manufacturers agreed to alter label.
E.3374	Pork Sausages	Informal	Meat content 60.5 per cent.	Poor in meat content.
C.2381	Channel Islands Milk	Formal	Deficient 14.2 per cent. solids-not-fat; freezing point indicated 18.0 per cent. extraneous water.	Section 32 (3) Food & Drugs Act, 1955. Fined £5 and £3.3.0 costs.
S.4555	Peas, Opened Can	Informal	Contained two pieces of cinder, together weighing 0.41 gramme.	Packers communicated with.
C.2405	Ice-Cream	Informal	Fat content only 4.6 per cent.	Vendor interviewed and cautioned. Further sample genuine.
S.4543	Boric Lint B.P.C.	Informal	The sample consisted of three packets of Boric Lint B.P.C. These contained only 1.75%, 1.08% and 0.78% boric acid respectively. B.P.C. limits 3.0—7.0 per cent. boric acid.	Same manufacturer. Manufacturer communicated with.
S.4545	Adhesive Dressings	Informal		
S.4574	Plain Flour	Informal	Creta Praeparata only 106 milligrammes per 100 grammes. Four (Composition) Regulations, 1956, require 235—390 milligrammes Creta Praeparata per 100 grammes.	Millers communicated with.
C.2443	Chopped Chicken, Canned	Informal	Contained 88 per cent. chicken.	No action advised.
S.4591	Coffee and Chicory Essence, Liquid, Sweetened	Informal	Contained only 0.23 per cent. caffeine. Food Standards (Liquid Coffee Essences) Order, 1945, requires 0.25 per cent. caffeine.	No action advised.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
E.3491	Pork Sausages	Informal	Meat content only 58 per cent.	Poor in meat content.
C.2530	Sweets	Informal	Unsatisfactory label.	Manufacturers communicated with.
S.4649	Sweets with portion of foreign matter	Informal	Contained a piece of broken glass tubing 2 centimetres long weighing 0·27 gramme.	Manufacturers cautioned.
N.1629	Ice-Cream	Informal	Fat content only 4·6 per cent. Milk solids not fat only 7·1 per cent.	Vendor interviewed. Further sample genuine.
C.2528	Ice Lollies	Informal	Labelled "Genuine Cream Fruit Lolly." Yet only one-fifth of the 2 per cent. fat present was milk fat.	Manufacturers communicated with.
C.2529	Ice Lollies	Informal	Consisted of an ice-cream lolly in a wrapper probably intended for another product. List of ingredients omitted "Fat and Milk Solids" which were present.	Manufacturers interviewed.
N.1628	Pork Sausages	Informal	Contained 240 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor interviewed.
E.3587	Cream Cheese	Informal	Contained fat 7·4 per cent., moisture 72·5 per cent. Consisted of skimmed curd cheese and not cream cheese.	Vendor cautioned.
E.3588	Cottage Cheese	Informal	Contained fat 4·7 per cent., moisture 75·0 per cent. Consisted of skimmed curd cheese.	No action advised.
S.4707	Pork Sausages	Informal	Contained 65 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor interviewed.
N.1655	Beef Sausages	Informal	Contained 200 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor interviewed.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
N.1652	Milk Loaf	Informal	Contained 4·5 per cent. non-fat milk solids. Statements on label claim "Conforms to the standard of the former National milk loaf" and "contains not less than 6 per cent. non-fat milk solids." Should state "original flour contained not less than 6 per cent. non-fat milk solids."	Bakers communicated with.
C.2544	Double Cream, Part Carton	Informal	Cream contained 50 parts per million formaldehyde. The material of the carton containing the cream yielded 1000 parts per million formaldehyde.	See also sample C.2619. Stocks of cartons withdrawn from Dairy concerned. Same Manufacturers of cartons as sample C.2619.
E.3626	Cream Sterilised	Informal	Fat content only 22·4 per cent. The Food Standards (Cream) Order, 1951, requires not less than 23 per cent. of milk fat in sterilised cream.	Further sample genuine.
C.2583	Ice Lollies	Informal	Contained 250 parts per million benzoic acid and 0·030 per cent. saccharin. These figures are abnormally high the limits for mineral waters being 120 parts per million and 0·012 per cent. respectively.	Makers interviewed.
C.2619	Double Cream	Informal	Cream contained 2 parts per million formaldehyde. Carton yielded 820 parts per million formaldehyde.	See Sample No. C.2544. Same Manufacturers of cartons. Stocks of cartons withdrawn from dairy concerned.
E.3616	Portion of Vanilla Slice	Informal	All three samples had a taint resembling the odour of guaiacol, associated with the custard filling. Could be due to decomposition of vanilla flavouring material used.	Bakers interviewed.
E.3617	Portion of Vanilla Slice	Informal		
E.3618	Vanilla Slices	Informal		
N.1716	Part of a Meat and Potato Pie	Informal	A dead earwig was embedded in the exterior surface of the crust of the pie.	Bakers cautioned.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
E.3689	Fruit Salad, Canned	Informal	Apricots and Pineapple present in greater quantity than Pears which are listed first in statement of ingredients.	No action advised.
C.2668	Fruit Salad, Canned	Informal	Ingredients listed in wrong order. Peaches in excess of Pineapples.	No action advised.
C.2675	Chicken Fillets, Canned	Informal	Chicken content 79 per cent. The words "In Chicken Jelly" should be part of the name or description.	Importers communicated with.
E.3732	Pork Sausages	Informal	Meat content only 62.5 per cent.	Slightly poor in meat content.
E.3693	Flour	Informal	Contained 1.4 milligrammes Iron, 0.16 milligramme Vitamin B ₁ and 1.0 milligramme Nicotinic Acid each per 100 grammes. Minimum limits 1.65 milligrammes Iron, 0.24 milligramme Vitamin B ₁ and 1.6 milligrammes Nicotinic Acid each per 100 grammes.	Millers communicated with.
S.9628	Pork Sausages	Private	Contained excess fat and deficient in lean meat in comparison with specification.	Manufacturers interviewed.
S.4747	Cough Candy	Informal	"Cough Candy" implies a recommendation as a medicine and therefore requires a quantitative disclosure of the formula or active ingredients.	Manufacturers communicated with.
E.3745	Orange Drink	Informal	No name and address of packer on label.	Packers agreed to alter label.
S.4750	Portion of Sliced Loaf containing foreign body	Informal	Contained 1.0 gramme of coarse red coloured paper, probably derived from a flour sack label.	Bakers cautioned.
E.3758	Butter Nuts, Flavoured	Informal	Butter-fat absent, therefore word "butter" should not be used even with the word "flavoured."	Manufacturers agreed to alter label.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
C.2753	Ground Almonds	Informal	Acid value of extracted oil 14 and sample had a stale flavour.	Stock withdrawn from sale.
E.3864	Pork Sausages	Informal	Contained 20 parts per million sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor interviewed.
E.3865	Beef Sausages	Informal	Meat content 49·0 per cent. Slightly low in meat content and contained 300 parts per million sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor interviewed.
C.2780	Part of Sliced Loaf	Informal	Contained 34 milligrammes of dough discoloured with iron oxide.	Baker communicated with.
N.1834	Ground Almonds	Informal	Acid value of extracted oil 6·1.	No action advised.
E.3924	Beef Sausage	Informal	Contained 140 parts per million of sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor interviewed.
E.3942	Orange Drink	Informal	No name of the food and no name and address on container.	Manufacturers agreed to alter label.
C.2845	Beef Suet	Informal	Beef fat content only 78 per cent. Food Standards (Suet) Order, 1952, requires not less than 83 per cent.	Packers notified See also sample No. N.2098.
C.2838	Glace Apricots	Informal	Contained 570 parts of sulphur dioxide per million parts of the sample. Limit for Glace fruit is 100 parts per million sulphur dioxide.	Retailer and Suppliers communicated with. Retailers stock withdrawn from sale.
C.2846	Parrish's Chemical Food B.P.C.	Informal	Contained 1·01 per cent. w/v ferrous phosphate. B.P.C. limit 0·85—0·95 per cent. ferrous phosphate.	No action advised.
N.1841	Mixed Pickles	Informal	Contained only 0·75 per cent. salt yet salt listed second in declaration of ingredients.	Packers communicated with. Correct label now in use.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
E.3956	Lemon Cheese	Informal	Soluble solids 61 per cent. (should be 65 per cent.). No name of food or name and address of packer on label.	Vendor interviewed. Agreed to label commodity correctly.
E.3957	Marmalade	Informal	Soluble solids only 64.1 per cent. (should be 68.5 per cent.). No name of food or name and address of packer on label.	Vendor interviewed. Agreed to label commodity correctly.
E.3958	Jam	Informal	No name and address of packer, no name of food on label.	Vendor interviewed. Agreed to label commodity correctly.
E.3975	Orange Drink	Informal	No name of food on the container.	Vendor interviewed. Agreed to amend label.
S.4916	Ground Almonds	Informal	Acid value of oil 9.5 and sample had stale taste.	Stock withdrawn from sale.
S.9630	Partly Sliced Loaf of Bread	Informal	10.5 grammes of the crumb of the loaf was slightly stained and contained 0.04 per cent. of mineral oil and 72 parts per million iron.	Bakers cautioned.
5009.S	Fruit Dried, Raisins	Informal	Heavily infested with dead mites, insect excreta on wrapping and raisins fermenting.	Stock surrendered to Local Authority.
5011.S	Fruit Dried, Currants	Informal	Sample contained the body of a dead wasp.	Packers notified.
E.3993	Barley	Informal	Contained 30 parts per million sulphur dioxide (which is not permitted in barley) and faced with 0.6 per cent. of mineral facing of the nature of talc.	Stock withdrawn from sale.
5078.S	Chemical Food	Informal	Should be labelled "Chemical Food B.P.C." Contained only 0.70 per cent. of iron as ferrous phosphate of which 0.02 was insoluble. B.P.C. limits 0.85—0.95 per cent. w/v ferrous phosphate.	Remainder of stock withdrawn from sale.
E.4132	Pork Sausages	Informal	Meat content only 62.5 per cent.	Poor in meat content.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
C.2977	Seidlitz Powders B.P.	Informal	Should no longer be labelled B.P. Contents of one white packet weighed 2.91 grammes and the contents of one blue packet weighed 10.75 grammes. Limits 2.25 — 2.75 and 9.5 — 10.5 grammes respectively.	Manufacturers notified. Old stock. Correct labels now in use.
N.2003	Shortbread	Informal	Contained 30 per cent. of total fat of which 40 per cent. consisted of butter. Should be labelled "Fat contains best butter 50 per cent." and the proportion of butter increased accordingly.	Manufacturers interviewed.
5112.S	Ground Almonds	Informal	Acid value of extracted oil 5.7.	No action advised.
E.2760	Fish Cake containing foreign body	Informal	Contained a small dark coloured vegetable tuber of the nature of a potato approximately 1.5 cms. in diameter and weighing 1.2 grammes. Potato is a normal ingredient of fish cakes.	Complainant interviewed and Manufacturers informed.
E.4166	Christmas Pudding	Informal	Contained only 8.6 per cent. fat. Christmas Puddings should contain not less than 9.0 per cent. fat.	No action advised.
C.3017	Pork Sausages	Informal	Contained 230 parts per million sulphite preservative (expressed as sulphur dioxide) without declaration.	Vendor interviewed.
5161.S	Mixed Dried Fruit	Informal	Ingredients listed in wrong order. Contained 17 per cent. more sultanas than currants.	Packers informed.
E.4223	Parrish's Chemical Food, B.P.C.	Informal	Contained 1.01 per cent. w/v ferrous phosphate. B.P.C. limits 0.85—0.95 per cent. ferrous phosphate.	No action advised.
C.3043	Double Cream	Informal	Cream contained 0.2 part per million formaldehyde. Carton yielded 720 parts per million formaldehyde.	Cartons withdrawn.
N.2073	Oatcakes	Informal	Unpleasant flavour. Acid value of extracted oil 80.	Vendor interviewed.

Table 21—continued.

No. of Sample	Description	Formal, Informal or Private	Nature of Adulteration or Irregularity	Observations
E.4242	Portion of Sliced Loaf	Informal	Contained 28 milligrammes of discoloured crumb containing 3 milligrammes of mineral oil and 0.015 milligramme iron.	Bakers communicated with.
N.2098	Shredded Suet	Informal	Beef fat content only 79.6 per cent. Food Standards (Suet) Order, 1952, requires not less than 83 per cent.	Same packers as sample No. C.2845.
E.4332	Portion of Sliced Loaf of Bread	Informal	Contained a small white button (similar to a shirt button) weighing 0.22 gramme baked into top crust of loaf. Appeared to have dropped on surface of dough before baking.	Bakers communicated with and cautioned.
E.4343	Jersey Milk	Formal	Deficient 13 per cent. fat.	Vendor cautioned. Further sample genuine.
5243.S	Stoned Raisins	Informal	Very heavily infested with mites.	No further stock available.
C.3136	Dried Peaches	Informal	Contained 2350 parts per million sulphite preservative (expressed as sulphur dioxide). Limit for dried peaches is 2000 parts per million sulphur dioxide.	Stock withdrawn from sale.
5314.S	Tapioca	Informal	Fifteen of the granules were slightly stained with blue colouring matter of the nature of Blue V.R.S. Otherwise genuine.	No action advised.
E.4427	Lentils	Informal	Contained 0.5 per cent. of foreign matter of the nature of insect excreta and remains, mineral particles, rust, etc.	Stock withdrawn from sale.

THE LABELLING OF FOOD ORDER

The first Labelling of Food Order was made in the year 1944, but it has been amended or re-enacted on several occasions since that time. The Order at present in force is the Labelling of Food Order, 1953, which came into operation on the 5th April of that year and which has been kept in force by the Twelfth Schedule of the Food and Drugs Act, 1955. Three amending Orders to the Labelling of Food Order, 1953,

were made in the years 1953, 1955 and 1958 and a further amending Order was made in the year under review and is mentioned in the section of this report dealing with ice-cream.

During the year under review, 61 samples (36 County and 25 from Autonomous Authorities) were found to contravene the requirements of the Labelling of Food Order. Brief details of the 36 County samples will be found in table 21. Of the total number of samples to which exception was taken 43 (27 County) had labels which did not disclose one or more of the following requirements ; the name and address of the packer, the true name of the food or a correct list of ingredients. In each of the above instances, the packers were communicated with and their attention drawn to the requirements of the Order. During the previous year, 1958, the number of samples which contravened the Labelling of Food Order included 18 County samples and 17 from Autonomous food and drugs authorities. In addition, four samples (2 County) submitted during 1959 bore no declaration (or an incorrect declaration) of the net weight and these were brought to the attention of the Weights and Measures Inspectors concerned.

In the following paragraphs reference is made to a number of the more interesting samples, in relation to their labels, submitted by County Sampling Officers and by Autonomous Food and Drugs Authorities.

Bread Samples No's S.3009 and N.759

These two informal samples of wrapped bread, baked in two different but associated bakeries, both bore a name for the bread, printed on the label, which included the word butter. Upon examination, however, the bread was found to be devoid of either butter or milk solids. In view of the fact that it is possible to obtain bread which does contain butter it was felt that the name applied to the above two samples might be misleading to a purchaser. The bakers concerned were communicated with and they stated that consideration was being given to the use of another name for the bread.

Bread Sample No. N.1652

This informal sample of wrapped bread bore a name which included the word milk and also made the claims :—" conforms to the standard of the former national milk loaf " and " contains not less than 6.0 per cent. of non-fat milk solids." Provision was made during the years 1955 and 1956 for the sale of " National Milk Bread " made from flour containing not less than six per cent. skim milk powder but this description was deleted from the Bread Order in the latter year. Upon examination the sample was found to contain 4.5 per cent. of non-fat

milk solids which is equivalent to 7·5 per cent. non-fat milk solids in the original flour. The claim that it conformed to the requirements of the former national milk loaf was, therefore, correct but the other claim inferring that the bread contained 6 per cent. non-fat milk solids really refers to the flour used. The correct claim should have been, “contains not less than 4·2 per cent. non-fat milk solids.” Shortly after this sample was examined the report of the Food Standards Committee on milk bread was published and this sample complied with the Committee’s recommendation as to the amount of skim milk solids which should be present. The Committee were not unanimously agreed, however, that the description “Milk Bread” should be permitted for bread containing skim milk solids as against whole milk solids. The bakers were communicated with and they agreed to amend the wording on the bread wrapper.

Ice Lollies, Samples No’s C.2528, 2995 and 3096

The first of these samples of prepacked ice lollies were described as “cream fruit lollies.” Upon examination, however, the total fat content was found to be only 2 per cent. of which not more than one-fifth was milk fat. In view of the Statutory requirement, introduced during the year under review, that the whole of the fat in Dairy ice-cream or cream ice shall consist of milk fat, it was felt that the use of the word “cream” in connection with these lollies was misleading, notwithstanding the fact that the ice-cream standards do not apply to ice lollies. The manufacturers were communicated with and they agreed to cease using the above description for their lollies. The remaining two samples were submitted by an Autonomous Food and Drugs Authority, both were imported commodities and were made by the same manufacturer. They were both labelled “Dairy Lollies.” Upon examination it was found that, although ice-cream was the main ingredient, no milk fat was present in the five per cent. fat content of the first sample, while not more than 0·5 per cent. milk fat was present in the 7·2 per cent. fat content of the second sample. Here again the manufacturers were informed that the name “Dairy Lollies” was misleading for products practically devoid of milk fat and they agreed, in future, to use the description “Ice-cream lollies.”

Shortbread, Sample No. N.2003

This informal sample was submitted with a copy of a statement that claimed, “contains best butter 50%.” Upon analysis, however, it was found that the total fat content was only 30 per cent. and of this fat only 40 per cent. consisted of butter. The claim should have read “Fat contains best butter 50 per cent.” and the proportion of butter in the fat increased sufficiently to justify this claim. The bakers were interviewed and they decided to discontinue making any claim with regard to butter content.

Rice, Sample No. 123

This informal sample, submitted by an Autonomous Food and Drugs Authority, had been imported in containers which bore labels which claimed that the rice was “enriched” and gave a declaration that each half pound of the rice or each cup of the cooked rice contained specified percentages of the minimum adult daily requirements of Vitamin B₁ (Thiamine) and Iron. Figures were also given for the Vitamin B₂ (Riboflavine) and Niacin contents. In addition, the label stated that Butylated Hydroxytoluene was added as preservative. Upon examination it was found that the amounts of the vitamins and iron present were as claimed and that the sample contained 12 parts per million of Butylated Hydroxytoluene. While the vitamin declaration and the presence of preservative might have been satisfactory in the country of origin, the former did not comply with the requirements of the Labelling of Food Order, which stipulates that the declaration of the amounts of these vitamins and iron shall be in terms of milligrams per ounce of the commodity. Furthermore, while Butylated Hydroxytoluene is permitted as an antioxidant in edible oils in this country in an amount not exceeding 200 parts per million, it is not permitted as a preservative or antioxidant in foods generally. The attention of the importers was drawn to the requirements of both the Labelling of Food Order and the Antioxidant in Food Regulations and, at the same time, the Ministry of Agriculture, Fisheries and Food was informed of the facts relating to this sample. It transpired that the importers had already raised the question of the vitamin declaration with the manufacturers and new labels conforming strictly to the requirement of the Labelling of Food Order, were already in use. The manufacturers had also previously been instructed that Butylated Hydroxytoluene was not permitted in rice in this country and the importers could only assume that some rice intended for the home market in the country of origin had inadvertently been packed for export.

Blackcurrant Juice Syrup, Sample No. 11/59

This informal sample, submitted by an Autonomous Food and Drugs Authority, bore a claim that it was “rich in Vitamin C” yet there was no declaration on the label of the minimum quantity of Vitamin C present, which is, of course, a condition required by paragraph 9 (2) of the Labelling of Food Order in respect of any such claim. Upon analysis, the sample was found to contain 29 milligrammes of Vitamin C per fluid ounce which, having regard to the Ministry of Food’s suggested Code of Practice for claims regarding Vitamins and Minerals, is sufficient to warrant the claim that it was rich in Vitamin C, if the Statutory declaration with regard to the minimum quantity present had also been made. Upon an examination of the remainder of the stock at the shop from

which the sample had been obtained it was found, however, that the other bottles were correctly labelled. No further action was, therefore, taken in respect of this sample.

Rice Pudding (canned) Sample No. 22/59

This sample, submitted by an Autonomous Food and Drugs Authority, bore on the label a declaration of ingredients which read, "milk, rice, sugar, flavouring" and a claim that it was made with full cream milk. Upon analysis, however, it was found that the sample contained only 1·8 per cent. milk fat and 8·3 per cent. of milk solids-not-fat. These figures correspond to approximately one-third of the milk present being in the form of skimmed milk, although the presence of the latter was not mentioned in the list of ingredients. The packers were communicated with and they stated that they only used full cream milk in the manufacture of these puddings but they had found that their method of mixing the contents of large milk tankers, before they were pumped out at the factory, was sometimes inadequate to effect complete mixing of the milk. Following receipt of this complaint another method of mixing was adopted.

Pollen Capsules, Samples No's 71/59 and 76/59

These were informal and formal samples respectively of the same imported commodity both purchased from the same retail shop and submitted for analysis by the Sampling Officer of the Borough of Morecambe and Heysham. Both samples gave similar analytical results and identical claims were made for them by the suppliers. The vials originally containing the samples bore labels which stated, "... Pollen (in Lactose)"; that each capsule contained 0·05 gramme pollen and that 3 capsules should be taken each day. Attached to the vials there were also certificates of purity claiming that the product was absolutely pure and entirely free from any added chemical or colouring whatsoever; the certificate also stated that the capsules were covered with high grade lactose to aid absorption. On display at the retail shop there was also an advertisement in the form of an open letter which made certain claims: *viz.* "... perfected this method of making essential vitamins in their natural condition available to mankind," "guaranteed absolutely pure natural vitamins packed at . . .", "a pure dietetic" and "not a Patent Medicine." The above general claims with regard to the presence of vitamins were made without any accompanying declaration

of the minimum quantities of the vitamins present. As already mentioned, both samples gave similar results upon analysis, the figures obtained on the formal sample being as follows :—

Moisture	3.3
Sugar (Sucrose)	32.7
Reducing Sugars (as Lactose)	15.1
Starch	16.2
Mineral Matter	7.8
*Pollen, etc.	24.9
	<hr/>
	100.0
	<hr/>

* Including :—

Carotene (as Vitamin A), 17 International Units per ounce of sample (or 0.22 I.U's per capsule),
 Vitamin B₁, 0.035 milligram per ounce of sample (or 0.00046 milligram per capsule),
 Vitamin B₂, 0.09 milligram per ounce of sample (or 0.0011 milligram per capsule),
 Nicotinic Acid, 0.35 milligram per ounce of sample (or 0.0046 milligram per capsule),
 Vitamin C, 2.9 milligrams per ounce of sample (or 0.038 milligram per capsule),
 Permitted Coal Tar colours (Tartrazine and Sunset Yellow F.C.F.) on outside of capsules (0.016 per cent.).

The above analysis is that of the whole of the capsules inclusive of the coating. The average weight of each capsule was 0.37 gramme of which the coating weighed 0.225 gramme ; only approximately one-third of the interior of the capsules consisted of pollen which was mixed with nearly double its weight of starch and other carbohydrates. Although the certificate of purity stated that the product was free from added colouring it will be noted from the analysis that the outsides of the capsules were coloured yellow with two permitted coal tar food colours.

In addition, pantothenic acid was determined because this is one of the more important vitamins in pollen, the amount found being 2.2 ugm. per capsule (or 0.17 milligram per ounce of the capsules). The content of this vitamin was, therefore, very small compared with its therapeutic dose of up to 100 milligrams.

The normal daily requirements of the other vitamins determined are :—3000 I.U's Vitamin A ; 0.9 milligram Vitamin B₁ ; 1.8 milligram Vitamin B₂ ; 12 milligrams Nicotinic Acid and 30 milligrams Vitamin C. From the analysis, however, the amounts which would be consumed, on the recommendation that three capsules should be taken each day, were only :—0.66 I.U's Vitamin A ; 0.0014 milligram Vitamin B₁ ; 0.0033 milligram Vitamin B₂ ; 0.014 milligram Nicotinic acid and 0.114 milligram Vitamin C. The Ministry of Food's suggested Code of Practice with regard to claims as to the presence of vitamins, which was based on the recommendations of the Medical Research Council, states *inter alia*, that unless at least one-sixth of the daily requirement of the vitamin

is present in the amount of the food that would ordinarily be consumed in one day, then no claim based on the presence of the vitamin should be made and no reference to its presence is justified in any advertisement or label. Comparison of the amounts of the vitamins in the sample compared with their normal daily requirements shows that in order to obtain one-sixth of the daily requirement of each, the following numbers of capsules would have to be taken each day :—Vitamin A 4,100 capsules, Vitamin B₁ 326 capsules, Vitamin B₂ 270 capsules, Nicotinic Acid 435 capsules and Vitamin C 130 capsules.

Although the analysis of the capsules indicated that they were very unsatisfactory having regard to the claims made for them, it is, however, not suggested that pure pollen is not a reasonably good source of vitamins of the Vitamin B complex and Vitamin C, but only that the amount of pollen in each of the capsules was too small to justify any claim. The amount of Vitamin B₁ present in the capsules, for example, when calculated on the basis of the actual pollen content indicated that the pollen itself was approximately equivalent to ordinary bakers yeast in its Vitamin B₁ content.

After consideration of the analytical results in comparison with the claims made in the labels and advertisement, the Food and Drugs Authority concerned instituted legal proceedings, not against the retailer, but against the distributors, who were also the importers, under section 113 (3) of the Food and Drugs Act. After giving the statutory 14 days notice to the Minister of Agriculture, Fisheries and Food of intention to institute proceedings under Section 6 and under Regulations made under Section 7 of the Act, four Summonses were issued. The first was in respect of a false label contrary to Section 6 (1) of the Act ; the second was in respect of an advertisement calculated to mislead contrary to Section 6 (2) of the Act ; the third was in respect of the advertisement claiming the presence of vitamins without specifying the minimum quantities present contrary to Article 9 (1) (c) of the Labelling of Food Order and the last was in respect of the omission to mark the container with a true statement of the appropriate designation of each of the constituents of the capsules contrary to articles 3, 4 (1) and 4 (3) (b) of the Labelling of Food Order. At the hearing the defendants pleaded “ not guilty ” to all the charges but, after hearing the evidence, the Magistrates found all the cases proved and imposed fines totally £50 together with costs amounting to £13.6.0 (£63.6.0 in all).

ICE-CREAM

Until November, 1948, there was no control in this country on the composition of ice-cream. In that month, however, the Ministry of Food decided to allocate additional supplies of sugar, and in some cases fats, to those manufacturers who undertook to include at least 2·5 per cent. fat in their ice-cream. In March, 1951, the first Statutory Standard for ice-cream was made and, except for a short period between July, 1952, and June, 1953, when a slightly reduced standard was temporarily introduced, the minimum standard then laid down was in operation until April, 1959. This standard required ice-cream to contain not less than 5 per cent. fat, 10 per cent. sugar and $7\frac{1}{2}$ per cent. milk solids other than fat. There were special standards for ice-cream containing fruit and for “ Parev ” (kosher) ice. The required sugar content of ice-cream could be made up of certain other sugars in addition to sucrose but no ice-cream was permitted to contain less than $7\frac{1}{2}$ per cent. sucrose.

When the above standard was first introduced in the year 1951 the Food Standards Committee of the Ministry of Food stated that it was not an ideal standard and that it should be amended and improved as supplies of ingredients became more plentiful. It was not surprising, therefore, that a Food Standards Committee report on the ice-cream standard was published in December, 1957, and that this should be followed by the making of the Food Standards (Ice-Cream) Regulations, 1959, which came into operation on the 27th April, 1959. The new standard incorporated in these regulations is as follows and applies whether or not the ice-cream forms part of a composite article of food:—

“ (a) Ice-Cream shall contain not less than 5 per cent. fat and $7\frac{1}{2}$ per cent. milk solids other than fat so, however, that where ice-cream contains any fruit, fruit pulp or fruit purée it shall either conform to the above standard or, alternatively, the total content of fat and milk solids other than fat shall be not less than $12\frac{1}{2}$ per cent. of the whole including the fruit, fruit pulp or fruit purée, as the case may be, and such total content of fat and milk solids other than fat shall include not less than $7\frac{1}{2}$ per cent. fat and 2 per cent. milk solids other than fat ;

Provided that as respects any ice-cream sold, or offered or exposed for sale under any of the descriptions hereinafter specified, or under any such other description as is calculated to lead an intending purchaser to believe that he is purchasing ice-cream of any such description as is so specified, the standard of composition shall be as follows :—

(i) Dairy ice-cream, dairy cream ice or cream ice shall in each case contain not less than 5 per cent. milk fat and no

other fat (save as may be introduced by the use as an ingredient of any egg, any flavouring substance or any emulsifying or stabilising agent) and not less than $7\frac{1}{2}$ per cent. milk solids other than fat, so, however, that where any dairy ice-cream, dairy cream ice or cream ice contains any fruit, fruit pulp or fruit purée it shall either conform to the standard of composition for that ice-cream or, alternatively, the total content of milk fat and milk solids other than fat shall be not less than $12\frac{1}{2}$ per cent. of the whole including the fruit, fruit pulp or fruit purée, as the case may be, and such total content of milk fat and milk solids other than fat shall include not less than $7\frac{1}{2}$ per cent. milk fat and no other fat (save as may be introduced by the use as an ingredient of any egg, any flavouring substance or any emulsifying or stabilising agent) and not less than 2 per cent. milk solids other than fat.

(ii) Milk ice or milk ice containing any fruit, fruit pulp or fruit purée shall contain not less than $2\frac{1}{2}$ per cent. milk fat and no other fat (save as may be introduced by the use as an ingredient of any egg, any flavouring substance or any emulsifying or stabilising agent) and not less than 7 per cent. milk solids other than fat.

(iii) " Parev " (kosher) ice shall contain not less than 10 per cent. fat and no milk fat or other derivative of milk.

(b) No ice-cream of any description shall contain any artificial sweetener.

In this Schedule —

(a) ' artificial sweetener ' means any chemical compound which is sweet to the taste, and the expression includes polyhydric alcohols but does not include sugar or any other carbohydrate :

(b) each reference to any proportion or percentage means that proportion or percentage by weight."

It will be noted that there is now no minimum standard for sugar content but there is a specific prohibition in the use of artificial sweeteners. The most important change is, however, the introduction of the special standards for dairy ice-cream, dairy cream ice, cream ice and milk ice which are all now required to contain specified minimum amounts of milk fat, the use of other types of fat not being permitted in these varieties of ice-cream.

On the same day that this standard came into operation an amendment to the Labelling of Food Order also came into force and this introduced requirements as to the labelling of ice-cream. It is now illegal to label or advertise ice-cream by means of words or pictorial devices suggestive of butter, cream, milk or anything connected with the dairy interest unless the ice-cream contains no fat other than milk fat. The label or advertisement may, however, bear a statement to the effect that the ice-cream contains skimmed milk solids. It is now also an offence to sell under the description "ice-cream" any pre-packed ice-cream which contains fat other than milk fat unless the wrapper also bears in letters of a specified height either the declaration "contains non-milk fat" or, if appropriate, the declaration "contains vegetable fat." The above requirements also apply to ice-cream which forms part of a composite article of food.

A third regulation concerning both ice-cream and certain types of ice lollies also came into operation on the 27th April, 1959, i.e., the Ice-Cream (Heat Treatment, etc.) Regulations, 1959. These regulations consolidate and amend the Ice-Cream (Heat Treatment) Regulations, 1947 to 1952. The new regulations require the ingredients of ice-cream after mixing to be either pasteurised or sterilized by one or other of the following methods :—

Pasteurisation

"Method I. The mixture shall be raised to and kept at a temperature of not less than 150° Fahrenheit for at least 30 minutes.

Method II. The mixture shall be raised to and kept at a temperature of not less than 160° Fahrenheit for at least 10 minutes.

Method III. The mixture shall be raised to and kept at a temperature of not less than 175° Fahrenheit for at least 15 seconds.

Sterilisation

The mixture shall be raised to and kept at a temperature of not less than 300° Fahrenheit for at least 2 seconds."

Before heat treatment the mixture shall not be kept for more than one hour at any temperature which exceeds 45°F and after heat-treatment it shall be cooled to not more than 45°F within 1½ hours and kept at this temperature until the freezing process is carried out. After freezing the ice-cream shall be kept at a temperature not exceeding 28°F; if its temperature does exceed this figure it must again be heat-treated before being re-frozen.

The above requirements as to pasteurisation or sterilisation do not apply to the use of a complete cold mix reconstituted with drinking

water if the mixture is made into ice-cream within one hour of reconstitution. The requirements also do not apply to any mixture (whether containing milk solids or not) used, either alone or with other mixtures, in the manufacture of water ice or similar products if the mixture has a pH value of 4·5 or less. It is considered that such products are sufficiently acid to prevent the growth of harmful bacteria without heat-treatment.

It will be noted from table 22, that the average fat content of ice-cream during the year under review is 8·9 per cent. and is the same figure as that recorded for the previous year so that the general improvement in the fat content of ice-cream found over the last 11 years, is still maintained. A perusal of the table shows that the average fat content in 1946 was only 2·3 per cent. whereas for 1958 and 1959 it was 8·9 per cent. Furthermore, the lowest fat content found during 1959 was 4·6 per cent.; whereas in the four years 1946 to 1949 fats as low as 0·3 and even 0·1 per cent. were found. Table 22 shows the results for all samples of ice-cream examined in the County Laboratory whether submitted by County Sampling Officers or by Autonomous Food and Drugs Authorities. A further rather interesting point emerges if the samples are subdivided into those submitted by the County and those submitted by Autonomous Authorities when the average fat content of County samples for the year is found to be 8·1 per cent., while the average figure for the Autonomous Food and Drugs Authorities' samples is 9·8 per cent. The difference in the figures is almost certainly due to a greater proportion of samples from small makers in the County area than in the Autonomous areas. Generally speaking, the small manufacturer uses an ice-cream mix containing less fat by weight but at the same time his product usually has less overrun than that of the big manufacturer. This difference in overrun in a commodity sold by volume tends to cancel out the difference in fat content of the two types of ice-cream.

During the year, 1959, 104 samples of ice-cream (excluding samples of dairy ice-cream and milk ice) were submitted for chemical analysis, 52 by County Sampling Officers and 52 by Autonomous Food and Drugs Authorities. Of these, four samples (Two County) were reported upon adversely, three of which did not comply with the Food Standards (Ice-Cream) Order. In the year, 1958, 12 samples were reported upon adversely. Of the two unsatisfactory County samples, one was deficient in fat and one was deficient in fat and milk solids other than fat. Details of the incorrect County samples together with the action taken will be found in table 21. It is interesting to note that one of the samples received from an Autonomous Authority and reported upon adversely was found to contain 1·3 parts per million of lead. The recommended

limit for lead in ice-cream is 1 part per million. The makers were interviewed and equipment inspected. A follow-up sample taken later was found to be satisfactory.

The average figures found for the 104 samples were—total solids 34.6 per cent. (maximum 55.2 ; minimum 27.4) and for fat content 8.9 per cent. (maximum 17.4 ; minimum 4.6). These figures as will be seen from the following table, which includes figures for the last 14 years, show that the big improvement in composition noted in the year 1950 has been maintained. It will be remembered that prior to the war a figure of eight per cent. was suggested by a trade association as a minimum standard for fat content and it is interesting to note that during the year under review, 61 samples out of the total of 104 showed fat contents varying from 8.1 to 17.4 per cent.

Table 22
Ice-Cream

YEAR	Number of Samples	Fat Content Average %	Total Solids Average %	Highest Fat %	Lowest Fat %	Highest Total Solids %	Lowest Total Solids %
1946	45	2.3	22.5	10.7	0.1	36.8	13.3
1947	59	3.0	23.6	10.6	Less than 0.1	39.2	14.1
1948	53	3.9	25.3	11.3	0.1	33.4	18.9
1949	171	6.4	29.3	13.3	0.3	45.9	14.7
1950	186	8.5	32.1	14.7	2.2	43.0	20.1
1951	230	8.6	32.6	15.6	3.3	40.7	23.0
1952	143	9.0	32.8	13.7	2.0	40.0	19.6
1953	130	8.6	32.7	15.2	2.5	42.3	23.3
1954	90	9.2	34.6	13.8	3.1	44.0	24.8
1955	95	8.1	33.2	13.3	3.5	40.9	24.3
1956	94	9.2	34.0	16.4	3.6	43.6	26.3
1957	99	8.7	33.3	14.7	3.0	41.9	22.9
1958	111	8.9	33.8	15.6	2.7	42.1	25.3
1959	104	8.9	34.6	17.4	4.6	55.2	27.4

Dairy Ice-Cream

Nineteen samples (8 County) of dairy ice-cream, not included in the foregoing table, were also submitted for chemical analysis. The

average figures found for the 19 samples were—total solids 37·0 per cent. (maximum 41·5 ; minimum 31·2) and for milk-fat content 10·7 per cent. (maximum 14·3 ; minimum 5·1). All the samples were found to be satisfactory.

Milk Ice

One sample was submitted by an Autonomous Authority. It was found to have a milk-fat content of 3·2 per cent. and a total solids of 29·3 per cent.

ICE LOLLIES

During the year under review 46 samples of ice-llies were submitted for examination under the Food and Drugs Act. Twenty-seven of the samples were submitted by County Sampling Officers, and 19 samples from Autonomous Food and Drugs Authorities. Unlike ice-cream there is no statutory standard for the composition of ice lollies. They are specifically excluded from the provisions of the Food Standards (Ice-Cream) Order while the Food Standards (Soft Drinks) Order refers only to liquid soft drinks although ice lollies are, in general, similar in composition to soft drinks. Ice lollies and ice-cream are, however, both mentioned in the revised report on lead of the Food Standards Committee of the Ministry of Food and in the Arsenic in Food Regulations which were published in the years 1954 and 1959 respectively. In these, maximum limits of only one part per million for lead and 0·5 part per million for arsenic (as As) are recommended or specified for both commodities. The limits for the majority of other foods being two parts per million and one part per million respectively. In addition to the special limits for lead and arsenic referred to above there are also recommended maximum limits for two other toxic metals in foods, *viz.*, copper 20 parts per million and zinc 50 parts per million. Of the 46 samples of Ice Lollies, 14 (six County and eight from Autonomous Authorities) were reported upon adversely. Of these, 13 (five County and eight from Autonomous Authorities) had unsatisfactory labels. The remaining sample, No. C.2583, submitted by a County Sampling Officer, was found to contain 250 parts per million benzoic acid and 0·030 per cent. saccharin. These figures are abnormally high, the Statutory limits for mineral waters, for example, being 120 parts per million and 0·012 per cent. respectively. The manufacturer, who had ceased production of ice lollies for the season, was interviewed and it transpired that he had been using the concentrate from which the lollies were made in much greater proportion than the instructions stated. Details of all the incorrect County samples together with the action taken will be found in table 21. Reference is also made to three of the samples which had unsatisfactory labels in the section of this report dealing with the Labelling of Food Order.

The total solids (sugars, etc.) in the samples ranged from as little as 0·6 per cent. to 34·5 per cent. with an average for the 46 samples of 15·5 per cent. The average total solids on the 14 samples examined in the previous year was 10·8 per cent.

SAUSAGE, MEAT PASTE AND FISH PASTE

On the 1st March, 1953, the last of the Meat Products Orders was revoked and this had the effect of removing all restrictions, for control purposes, on the price and composition of both pork and beef sausages. It should be noted, however, that the Orders mentioned above were made by the Minister of Food for the purpose of controlling the sale of certain commodities which were, or had been, in short supply. In view of the increased supplies of meat available subsequent to February, 1953, it would appear reasonable to expect that sausages should now have at least the same meat content as in the days of control and short supply and successful prosecutions were instituted by the County, in the years 1953, 1954 and 1955, following the revocation of the Meat Products Orders, in respect of samples of pork sausages found to be seriously deficient in meat. In these cases taken under Section 3 of the Food and Drugs Act, 1938, the Courts accepted the opinion of your Analyst that genuine pork sausage must contain not less than 65 per cent. of meat.

During the year 1956, however, the position was rendered difficult by the results of two Appeal cases in which the judgments went against the prosecution. In the case of *Marston v. Loney* heard in October, 1955, the standard suggested by the Public Analyst was based on the standard previously fixed under the Meat Products Order which had by then been revoked. No other evidence as to a standard was given. In the other case of *Thrussell v. Whiteman* in January, 1956, the Lord Chief Justice said "The sooner it is seen that these cases lead to chaos and it is prescribed what a sausage is the better," he also thought that it depended on the price. This last is quite a new concept in deciding whether a particular food is genuine and up to standard so far, at least, as the Food and Drugs Act is concerned. While successful prosecutions have been taken by some Food and Drugs Authorities subsequent to the above Appeal cases there is no doubt that it is now difficult to obtain convictions particularly in the case of sausages which are relatively cheap in price.

The last Meat Products Order, revoked on the 1st March, 1953, in addition to controlling price and meat content, also prohibited the use of certain specified offals in the preparation of sausages and other uncooked open meat products intended for human consumption. The restriction on the use of these offals was, however, re-enacted in the Offals in Meat Products Order, 1953.

The compositions of meat paste and of fish paste are controlled by the Food Standards (Meat Paste) Order, 1951, and the Food Standards (Fish Paste) Order, 1951. The standard for meat paste is a minimum of 55 per cent. meat and for fish paste a minimum of 70 per cent. fish. The standards apply to both imported and home produced products.

During the year 1959, 84 samples of sausages, one of sausage meat, three of canned sausage, one canned sausage with beans, two pork and tomato, three Cumberland and one liver sausage were examined as against 80 samples of sausage and 12 samples of canned sausage, etc., in the previous year. Sixty-three samples were examined for the County (including one sausage meat, one canned, one pork and tomato, one canned with beans and three Cumberland) and 32 (including two canned, one pork and tomato and one liver) for Autonomous Food and Drugs Authorities. Of the total number of sausage samples submitted during the year under review, 40 consisted of beef (including one sausage meat) and 45 of pork. Nineteen County samples and 13 submitted by other Food and Drugs Authorities were reported upon adversely. A perusal of table 21 will show that while six of the County samples were poor in meat the deficiencies were not serious. Twenty of the samples examined, including 11 County samples, contained normal amounts of sulphite preservative but without any declaration of the presence of preservative being made on the label or exhibited in the shops concerned. This is contrary to the requirements of the Public Health (Preservatives, etc., in Food) Regulations, 1925 to 1958. Of the remaining three County samples which were reported upon adversely two contained foreign matter and one did not comply with the requirements of a specification. Details of all the adulterated County samples together with the action taken, will be found in table 21.

It is interesting to note that the average meat content of 39 samples of beef sausage examined in the County Laboratory during the year 1959 was 60·8 per cent., while the average meat content of 45 samples of pork sausage examined over the same period was 67·4 per cent. Bearing in mind that the standards before the 1st March, 1953, under the Commodity Control Order, were a minimum of 50 per cent. meat for beef sausage and beef sausage meat and a minimum of 65 per cent. meat for pork sausage and pork sausage meat, the average figure obtained in the County Laboratory during the year 1959 for beef sausages is very satisfactory. In fact of 39 samples of beef sausage only one contained less than 50 per cent. meat. With regard to pork sausage the average results are also satisfactory, although there was a decrease of 2·0 per cent. on the average figure obtained in the previous year. It will be remembered that the average meat content for 48 samples submitted during the year 1958 was 69·4 per cent. Of the 45 samples of pork

sausages submitted during the year 1959, nine (or 20 per cent.) contained less than 65 per cent. meat. Although this cannot be regarded as satisfactory it must be emphasised that it cannot be assumed that the position with regard to pork sausage has deteriorated since control was removed at the beginning of the year 1953. Fifty per cent. of the pork sausage samples submitted in each of the years 1951, 1952 and 1953 were reported upon adversely and the proportions of unsatisfactory samples for the years 1954, 1955, 1956, 1957 and 1958 were 39 per cent., 24 per cent., 32 per cent., 26 per cent. and 12 per cent. respectively.

Eight samples of meat paste (seven submitted by County Sampling Officers and one by an Autonomous Authority) were examined during the year and all were found to be satisfactory.

With regard to fish paste, 30 samples (16 County) were submitted for examination during the year and, of these, one (from an Autonomous Authority) was reported upon adversely. This informal sample was found to be deficient of 14.2 per cent. of the minimum percentage of fish. The manufacturers were interviewed and cautioned and a follow up sample was found to be satisfactory.

BARLEY

In addition to malting, barley is used in soups, infant and invalid foods, etc. For these latter purposes the grain is milled to remove the husk and brown seed coats. "Pot barley," is the name given to the product which has been less drastically treated while "Pearl barley" is milled and polished to such an extent that the grains are round instead of oval in shape and almost white in appearance. The husk and outer layers of the grain contain a greater proportion of natural mineral matter than the milled grain with the result that the ash of pearl barley is of the order of 1.0 per cent. or even less whereas unmilled barley has an ash of the order of 2.5 per cent. At one time pearl barley was sometimes faced with talc, rice flour or cornflour in order to further improve its appearance but as this practice can be considered to be a form of sophistication it is only on very rare occasions that evidence of facing is now found. Furthermore, Barley is not one of the foods listed on the First Schedule to the Public Health (Preservatives, etc. in Food) Regulations so that the presence in barley of sulphur dioxide or other chemical preservative is not permitted.

During the year under review 38 samples of barley were submitted, 32 by County Sampling Officers. Only one sample was reported upon adversely. Informal sample No. E.3993, which had the appearance of pearl barley, was found upon examination to be faced with 0.6 per cent. of mineral facing of the nature of talc and to contain 30 parts per million of sulphur dioxide. This sample had been purchased at a retail

shop owned by a company operating a number of shops and on representations being made to the firm, the remainder of the stock was immediately withdrawn from sale from all the branches.

Barley is liable to become infested with mites (*Tyroglyphus farinae*) but none of the samples examined during the year 1959 were reported upon adversely for this reason.

CREAM

Statutory Standards have been in force for several years for the composition of single cream, double cream, sterilised cream and for clotted cream. Furthermore, section 47 of the Food and Drugs Act, 1955, is designed to prevent the misuse of the designation "cream" in relation to cream substitutes, whether or not the word "cream" is only part of a composite description and whether or not the substance is sold singly or as part of another food. The only exceptions to the provisions of section 47 of the Act are reconstituted and imitation cream sold as such or a substance sold under a description which indicates that it is not for use as, or as a substitute for, cream.

The Statutory Standards referred to above are contained in the Food Standards (Cream) Order, 1951, and are as follows :—

" 1. Except as respects clotted cream, cream shall consist of that part of cows' milk rich in fat which has been separated by skimming or otherwise and—

- (a) no cream, whether described as cream, single cream, pouring cream, coffee cream, fruit cream or as any other description of cream, shall contain less than 18 per cent. by weight of milk fat ;
- (b) no sterilised cream shall contain less than 23 per cent. by weight of milk fat ;
- (c) no double cream or thick cream shall contain less than 48 per cent. by weight of milk fat.

2. Clotted cream shall consist of that part of cows' milk rich in fat which has been produced and separated by the scalding, cooling and skimming of cows' milk or cream and shall contain not less than 48 per cent. by weight of milk fat."

In addition to the above Statutory Standards the Food Standards Committee of the Ministry of Food in 1951 published reports recommending minimum fat contents for reconstituted cream and for imitation cream.

Reconstituted cream (formerly known as artificial cream) is made from ingredients derived from milk with the addition of water and the Committee's recommendation was that it should contain not

less than 18 per cent. milk fat ; reconstituted double cream to contain not less than 48 per cent. milk fat.

Imitation or mock cream (formerly known as synthetic cream) is made from a variety of oils or fats together with emulsifying and stabilising agents. The recommendation here was that it should contain at least 25 per cent of fat.

Mention must also be made of whey cream—the product obtained by concentrating the small amounts of milk fat present in whey. Whey cream normally has a milk fat content equal to that of double cream but it can be distinguished from the latter in that, as is to be expected, the protein and calcium in the non-fatty solids of whey cream are appreciably lower than in cream made from whole milk.

During the year under review no samples of reconstituted cream or of imitation cream were submitted but 36 samples of double cream, two of single cream, 39 of sterilised cream and one of whey cream were examined. Of the total of 78 samples, 50 were submitted by the County Sampling Officers. Six samples (five County) were reported upon adversely. An informal sample of Double Cream, No. C.2356, was found upon examination to contain only 47 per cent. of milk fat, or one per cent. less than the Statutory Standard. The vendor was interviewed and a further sample was found to be satisfactory. An informal sample of sterilised cream, No. E.3626, was found upon analysis to contain only 22·4 per cent. of milk fat as compared with the minimum Statutory Standard of not less than 23 per cent. Here also a further sample was found to be satisfactory. The remaining four unsatisfactory samples (three County) all consisted of double cream and they all satisfied the requirements of the Food Standards (Cream) Order in regard to their milk fat contents. Upon further examination, however, they were found to contain formaldehyde to the extent of 0·2, 1, 2 and 50 parts per million respectively. The cartons in which they had been sold yielded 720, 600, 820 and 1,000 parts per million of formaldehyde respectively. Although the samples of cream had been purchased from different shops and dairies the cartons had all been made by the same firm. The amount of formaldehyde found in three of the samples was relatively small but this substance is a chemical preservative not permitted in any food. Cream is not permitted to contain preservative and it is clearly undesirable, to say the least, that it should be packed in cartons which might yield formaldehyde to the cream, particularly as there were indications that the amount found in the cream increased with the length of time the cream remained in the cartons. Upon enquiry from the manufacturers of the cartons it transpired that all the cartons concerned had been made from one particular consignment of imported laminated paper bonded with synthetic resin and that the formaldehyde

was derived from the latter. All stocks of the affected cartons were at once withdrawn by the manufacturers and replaced with cartons made from formaldehyde-free paper. Details of the unsatisfactory County samples are given in table 21.

The one sample of whey cream, submitted by an Autonomous Food and Drugs Authority was found upon analysis to have a milk fat content of 49·7 per cent. It was, therefore, equivalent in its milk fat content to double cream.

CREAM CHEESE

There are no statutory standards for cream cheese in this country, although before the last war, under the National Grading and Marking Scheme, regulations were made in the years 1935 and 1938 providing for a minimum milk fat content of 55 per cent. in national mark cream cheese and 70 per cent. (later amended to 60 per cent.) for double cream cheese. Since the year 1951, however, there have been Statutory Standards of not less than 18 per cent. milk fat for cream and 48 per cent. for double cream. It is, in your Analyst's opinion, reasonable to assume, in the absence of Statutory Standards, that cream cheese and double cream cheese should be made from cream and double cream respectively. If made according to the normal method, from cream or double cream satisfying the statutory requirements, then cream cheese contains a little over 50 per cent. milk fat and double cream cheese a little over 65 per cent. milk fat. It should be noted that the above percentages are based on the cream cheese as sold. The milk fat content of cheese is sometimes calculated on the dry matter of the cheese; this method of declaration obviates discrepancies due to changes in the moisture content of cheese but the figures quoted above, if they had been based on the dry matter, would have had to be increased in order to obtain a similar quality cheese.

Before the year 1939 your Analyst examined samples of cream cheese which had milk fat contents of 70 per cent. or even as high as 80 per cent. but it has since become increasingly difficult, at least in Lancashire, to obtain samples of genuine cream cheese. During the year under review no samples which could be regarded as genuine cream cheese were submitted for examination but the following three unsatisfactory samples were submitted, all by County Sampling Officers. Informal sample, No. N.1526, was an imported product submitted as pasteurised processed cream cheese. Upon examination it was found to contain 34·3 per cent. milk fat and 53·1 per cent. moisture; the analysis also indicated that it had been made from a mixture of milk and cream containing approximately 12·5 per cent. milk fat. The latter represents only approximately two-thirds the fat content of genuine cream and

it will be noted that the fat content of the sample was also only approximately two-thirds of what is suggested as the minimum figure for a genuine cream cheese. The importers were communicated with and informed that this commodity conformed rather to the description of a processed soft cheese than to that of a cream cheese. Informal sample No. C.2348 was purchased by a sampling officer who had asked the shopkeeper for cream cheese. Upon examination, however, it was found to contain 18·6 per cent. milk fat and 60·4 per cent. moisture; the analysis indicated that it had been made from milk containing 3·1 per cent. of fat. The soft nature of the cheese was due to its high moisture content and not, as in the case of cream cheese, to a high fat content. The sample was, in fact, a curd cheese made from sour milk and the vendor was interviewed and cautioned for selling it as cream cheese. Informal sample No. E.3587 was also purchased from unlabelled stock in a retail shop following a request for cream cheese. Upon examination it was found to contain 7·4 per cent. milk fat and 72·5 per cent. moisture; it had been made from skimmed milk containing 1·45 per cent. fat. It was a skimmed curd cheese bearing little resemblance to genuine cream cheese. The vendor was cautioned for supplying it on request for cream cheese. Incidentally, the last two samples were sold at prices less than those charged for ordinary varieties of hard cheese and much less than it would have been necessary to charge for genuine cream cheese.

BORIC ACID LINT AND BORIC ACID DRESSINGS

Boric Acid lint is the subject of a monograph in the British Pharmaceutical Codex, 1954. It is prepared from absorbent cotton lint which has been impregnated with boric acid. The B.P.C. requires it to contain from 3·0 to 7·0 per cent. of boric acid and to pass a prescribed absorbency test. During the year under review a total of 21 samples were submitted under the above heading, all by County Sampling Officers. Eighteen of the samples were submitted as "Boric Acid lint B.P.C." one was a special quality boric lint, one consisted of pads of boric lint and the remaining sample consisted of dressings of boric acid lint attached to zinc oxide adhesive plaster. Three of the samples of Boric Acid lint B.P.C. and the sample of adhesive dressings were reported upon adversely. Informal samples Nos. N.1357 and N.1366 were purchased at different shops but the lint was found to be the product of one manufacturer. The first sample contained only 2·2 per cent. boric acid while the other sample contained only 2·65 per cent. as compared with the B.P.C. standard quoted above. The vendors and the manufacturer were communicated with and the latter was at a loss to account for the deficiency, although possible suggestions made were, either that the bath of boric acid solution had become partially exhausted, or uneven distribution on the lint, or loss of powdered boric acid in cutting

up and handling the lint to make up into small prepacked packages. Informal sample No. S.4543 consisted of three packets of boric acid lint B.P.C. which were found upon analysis to contain only 1.75, 1.08 and 0.78 per cent. of boric acid respectively. The sample of adhesive dressings No. S.4545 bore a declaration that the lint contained 4—6 per cent. boric acid and that it was attached to zinc oxide adhesive plaster. Upon examination, however, the lint was found to contain only 2.0 per cent. of boric acid. The last two samples mentioned were purchased from two differently owned mobile shops but after quite exhaustive enquiries it was found that both samples were the products of one manufacturer (not the same manufacturer as the first two unsatisfactory samples). Here again it was not possible to ascertain with certainty the cause of the deficiencies although the manufacturer stated that every effort would be made to ensure that all future supplies were satisfactory.

CAMPHORATED OIL

For many years the British Pharmacopoeia has required camphorated oil to contain 20 per cent. of camphor but, due to changing conditions mainly brought about by the last world war, the nature of the oil in which the camphor is dissolved has been altered twice within the last 18 years. In the British Pharmacopoeia 1932, the composition of camphorated oil was declared to be 20 per cent. by weight of camphor in olive oil. Soon after the beginning of the war, in June, 1940, the Second Addendum to the Pharmacopoeia permitted arachis oil, cottonseed oil or sesame oil to be used in place of olive oil. This position continued until the publication of the British Pharmacopoeia, 1948, when the composition of camphorated oil was changed to 20 per cent. by weight of camphor in arachis (ground nut) oil. This last formula has also been included in the present (1958) edition of the British Pharmacopoeia; the limits for camphor content being fixed at 19.0 to 21.0 per cent. w/w.

During the year under review 18 samples of camphorated oil were submitted for examination, 15 being submitted by County Sampling Officers; of these two County samples were reported upon adversely. Informal sample No. N.425 was found upon examination to contain 18.9 per cent. camphor, the minimum B.P. limit being 19.0 per cent. In view of the very slight deficiency found, no action was advised in respect of this sample. Informal sample No. N.444 was labelled "Camphorated Oil B.P." Its camphor content was correct but upon further examination it was found to be coloured with an oil soluble coal tar colour. The instructions for compounding this commodity given in the British Pharmacopoeia make no provision for the addition of colouring matter. Furthermore, although this commodity does not, of

course, come within the provisions of the Colouring Matter in Food Regulations, 1957, it was found that the colouring matter present was not a colour permitted in food. The manufacturers were communicated with and they stated that the colouring matter had been added during compounding and its presence had not been noted by their own testing laboratory. They at once agreed to conform strictly to the requirements of the B.P.

LIQUID PARAFFIN B.P.

The British Pharmacopoeia contains monographs on two types of liquid paraffin, *viz.*, "liquid paraffin" and "light liquid paraffin." The former is the variety usually purchased and is used as an internal lubricant. Light liquid paraffin may be used as a vehicle for oily spray solutions. Both are colourless oily liquids but one is much more viscous than the other. Liquid paraffin is required to have a weight per ml. at 20°C of 0.870 to 0.890 gm. and a kinematic viscosity at 37.8°C of not less than 64 centistokes. Light liquid paraffin, on the other hand, has a weight per ml. at 20°C of 0.830 to 0.870 gm. and a kinematic viscosity at 37.8°C of not greater than 30 centistokes. In addition, both types of liquid paraffin are required, *inter alia*, to satisfy limit tests for carbonisable substances and for sulphur compounds. Tocopherol may be added as a stabiliser to liquid paraffin B.P. to the extent of 10 parts per million.

During the year 1959, twenty-seven samples of liquid paraffin B.P. were submitted for examination, 19 by County Sampling Officers, and of these seven (three County) were reported upon adversely. Informal sample No. N.875 was found upon examination not to comply with the B.P. limit test for carbonisable substances. After communicating with the vendor it was found that the liquid paraffin had been bottled from bulk stock by the vendor; furthermore, the suppliers reported that the remainder of the bulk stock had been tested and found to be satisfactory although they agreed that a portion of the sample sold to the Sampling Officer and examined by their Analyst did not comply with the limit test. It would seem, therefore, that the liquid paraffin had been contaminated when bottled for retail sale, either by the material of the material of the bottle cap or by a bottle which was not perfectly clean. The remaining two unsatisfactory county samples (No's C.1712 and S.3981) and the four unsatisfactory samples submitted by an Autonomous Food and Drugs Authority were all originally supplied by the same packer but were purchased from three different retail shops. The two County samples failed both the limit test for carbonisable substances and that for sulphur compounds. Two of the unsatisfactory samples from the Autonomous Food and Drugs Authority also failed

both the limit tests while the other two samples only failed the test for carbonisable substances. The results of the examination of these samples were brought to the notice of the packer and he withdrew from sale the remainder of the retail stocks concerned. It must be mentioned that, here again, at least some of the failure of these samples may have been due to contact with unsatisfactory bottle caps. The last unsatisfactory sample (which failed only the limit test for carbonisable substances) was one of two bottles taken from fresh stock ; the contents of the second bottle proved to be satisfactory. It was noticed that the cap of the bottle containing the sample which failed the limit test contained no liner while the other (satisfactory) sample had a liner inside the cap.

SAMPLES CONTAINING EXTRANEEOUS MATTER

During the year under review 49 food and drugs samples (35 County) were reported upon adversely because they were found upon examination to contain extraneous matter. The corresponding number for the year, 1958, was 58 samples. In addition, a further six samples, found to contain extraneous matter, were submitted under the heading of miscellaneous samples and are mentioned in Part VI of this report. Of the 49 food and drugs samples, 12 were samples of milk, the remainder consisted of various types of foods. The wide range of extraneous matter found in the samples included :—broken glass, buttons, pieces of wood, saw-dust, fragments of chalk, green pencil point, bird droppings, fragments of leaf, fungus, atmospheric dust, goat or sheep dung, cinders, used tobacco cigarette, string, partially digested bovine food (cud), ultramarine and other blue pigments, adhesive plaster, iron oxide, fragments of iron and steel, galvanised iron staple, used mineral oil, cotton cloth saturated with pure mineral oil, paper flour sack label, vegetable stem, small whole potato, small feather and crystals of vanillin. Brief details of the samples which were the subject of prosecutions are given below.

Part Bottle of Milk. Sample No. 5012 S.

This sample, submitted on complaint, consisted of a pint bottle of milk from which approximately two fluid ounces of milk had previously been removed. The bottle was not in any way chipped or broken but upon examination it was found to contain one milligram of powdered glass. 7.77 grammes of broken glass were submitted separately ; this was stated to have been sieved, by the purchaser, from the milk in the bottle. This latter quantity of broken glass consisted of fragments varying in length from 20 millimetres down to small particles. Upon examination it was found that the shape and physical characters of these pieces of broken glass were consistent with the fragments having originally formed part of a similar bottle. Legal proceedings were

instituted against the dairy concerned. The defendants pleaded "not guilty" but after a very full hearing they were fined £25.0.0 together with £12.15.0 costs (£37.15.0 in all).

Part of a Fruit Cake, Sample No. E.774

This sample, submitted on complaint, consisted of the end (one and a half inches thick) of a loaf-shaped cake containing mixed dried fruit, a slice which appeared to have been cut from the cake and five black round or flattened objects each about eleven millimetres long and weighing in all 1.29 grammes. The latter were stated to have been found in the cake. The foreign matter, upon examination, was found to consist of goat or sheep dung, adhering to which were firmly baked on fragments of cake crumb. The dung had almost certainly been present in the dried fruit used in making the cake; it will be remembered that another similar instance, but concerning another bakery, occurred during the previous year. Legal proceedings were instituted under Sections 2 and 113 (3) of the Food and Drugs Acts against the manufacturing bakery concerned. They pleaded "not guilty" and submitted a Warranty defence which did not, however, comply with the requirements of Section 115 of the Act. The Magistrates found the case proved but the defendants were given an absolute discharge on payment of £20.6.0 costs.

Part of Custard Tart, Sample No. E.777

This sample, also submitted on complaint, consisted of three quarters of a custard tart which had previously been cut into quarters. Upon examination it was found to contain partially smoked tobacco and paper which, with adhering matter from the tart, weighed 0.8 gramme. The bulk of the tobacco was embedded in the interior surface of the pastry, under the custard filling, at the bottom of two sections of the tart and appeared to have been cut through in cutting the tart, fragments of tobacco also being found on the adjoining cut surfaces of the custard. The two larger portions of tobacco were each about one inch long and appeared to have formed part of a cigarette. The retail confectionery and bakery concerned was prosecuted and at the hearing of the summons the two partners in the firm were each fined £10.0.0 and costs (£25.10.0 in all).

Cooked Bovine Oesophagus, Sample No. E.778

This material is sold in certain areas in the County at shops which sell tripe and similar products and it is known locally as "Wezzle" or "Wezand." Normally it is very thoroughly cleaned before cooking but in this instance the interior of the portion purchased by the complainant was found to contain 4.5 grammes of partially digested grass, etc., i.e., regurgitated food or cud. This had a very offensive appearance and its

presence was, of course, proof that preliminary cleaning had, at the best, been only perfunctory. Legal proceedings were instituted directly against the firm that had prepared the product for sale and the two partners were fined £10 and £3.10.0 costs each (£27.0.0 in all).

Part of Apple Tart. Sample No. 263/59

This informal sample was submitted by an Autonomous Food and Drugs Authority following a complaint. The sample consisted of a flat circular apple tart which had previously been cut in half and from which a small segment had been removed. Bridging the cut was an adhesive plaster measuring 3 inches by $\frac{3}{4}$ inch with an attached white cotton gauze dressing. One end of the plaster was firmly embedded in and baked into, the interior of the bottom crust of one piece of the tart near the outer edge of the pastry, the other end of the plaster being similarly attached to the other piece of the tart. The plaster had probably been used, as the protective backing had been removed, but no visible evidence was found of any contamination from a wound. Legal proceedings were instituted against the bakers concerned who pleaded " guilty " at the hearing of the case and were fined £20 and £4 costs.

SAMPLES CONTAINING INSECT OR INSECT REMAINS

Fifteen food and drugs samples (12 County) came under the above heading during the year under review. The corresponding number for the year 1958 was 20 (11 County) samples. The more interesting of the County samples are described briefly in the following paragraphs :—

Part Packet of Potato Crisps, Sample No. E.2752

This informal sample, submitted on complaint in the original bag in which the crisps had been packed, consisted of only half an ounce of crisps (i.e. approximately only half the original weight). There were also present in the bag one dead cockroach and a crumb of bread. Upon examination it was found that the body of the cockroach had not dried out, the body cavity was not filled with fat and it had not the swollen appearance of a cockroach which had been heated in hot fat. Furthermore, a portion of the body of the insect gave a strong phosphatase test which also indicated that it had not been heated. In view of the above technical evidence, the fact that the bag was open when received and the evidence obtained from the manufacturers that the crisps were sealed in bags within a few minutes of being cooked, it was difficult to believe that the cockroach had got into the bag on the premises of the manufacturers although the latter were interviewed in regard to the matter.

Coffee, Sample No. E.2758

This informal sample consisted of the remainder ($2\frac{1}{2}$ ounces) of some coffee which had been purchased loose, emptied from the bag into another container and then, after a number of days, again placed in a bag and submitted as a complaint. Upon examination, the relatively small amount of coffee submitted was found to contain one dead adult cockroach, a dead young cockroach (parts of the legs and antennae of the cockroaches were found loose in the coffee), a piece of dried-up ham or bacon weighing 0.55 gramme and eight light coloured cat hairs. Although parts of the legs and antennae of the cockroaches had become detached from the bodies, all were found in this relatively small amount of coffee remaining from the purchase. Both the shopkeeper and the complainant had a cat on their premises. In order to try to obtain further evidence as to where the contamination of the coffee had occurred, the whole of the coffee (approximately $3\frac{1}{2}$ lb.) remaining in the tin in the shop from which the customer had been served was examined for foreign matter with negative results. Under the circumstances described above it was decided to notify both the purchaser and the shopkeeper of the results of the examination and to impress upon both the desirability of keeping commodities of this kind in closed containers.

Stoned Raisins, Samples No. 5009.S and 5243.S

These two samples consisted of prepacked raisins, the products of two different firms, which were submitted by a County Sampling Officer. Upon examination the first sample was found to be fermenting, it was heavily infested with dead mites and there was insect excreta on the wrapping paper. The remainder of the stock at the shop concerned was surrendered to the local Authority. The other packet of stoned raisins was found to be very heavily infested with live sugar mites (approximately 144,000 mites in the contents of the $\frac{1}{2}$ lb. packet). Upon investigation it was found that there was no further stock at the shop from which the purchase had been made.

Lentils, Sample No. E.4427

This informal sample, purchased loose, consisted of half a pound of lentils which upon examination was found to contain 1.25 grammes, corresponding to 0.5 per cent., of foreign matter consisting mainly of insect excreta and insect remains together with a small amount of mineral matter. No live insects were found. The remainder of the stock at the shop concerned was withdrawn from sale.

Milk, Sample No. S.4140

This consisted of a part filled one-third pint bottle of school milk submitted as the result of a complaint. The cap of the bottle had been

removed and replaced before the sample was received for examination. The sample was found to contain a dead carnivorous ground beetle approximately $\frac{1}{2}$ inch long and weighing 0.11 gramme. Upon submitting both the milk and a part of the beetle to the phosphatase test, it was found that the milk had been correctly pasteurised but the beetle had not been heated. Beetles of this type are found in fields and gardens, they can fly and they are not pests found on food preparing and storage premises. The result of the examination of this sample was brought to the notice of the dairy concerned.

PROSECUTIONS

When the adulteration of a sample is considered to be sufficiently serious, legal proceedings are instituted. Prosecution, however, is only one of the means of dealing with adulterated or otherwise unsatisfactory samples. A perusal of tables 10 and 21, which are concerned with the various types of milk adulteration and sophisticated samples other than milk, respectively, shows that many of the samples are only slightly adulterated. In the case of food and drug samples, other than milk, deterioration may be due to long storage or adulteration may be brought about by the action of some person other than the actual vendor. In these instances it is often considered appropriate to take less drastic action than legal proceedings. In the case of milk samples vendors are sometimes cautioned and subsequent samples then frequently prove to be genuine; in other instances dairies are visited by the Sampling Officers in order to correct faulty dairy management which has given rise to unsatisfactory samples. In the case of other foods and drugs appropriate action may take the form of the surrender for destruction of the remainder of any unsatisfactory stocks, returning stocks to manufacturers or communicating with packers with regard to unsatisfactory labels, etc.

During the year a total of 373 County food and drugs samples were reported upon adversely and in respect of 17 of these prosecutions were instituted, 11 in respect of milk samples, three in respect of Channel Islands Milk, and three in respect of samples containing extraneous matter. There were 17 convictions or orders to pay costs. The total fines and costs during the year amounted to £279.13.0. In table 23 will be found similar information for the years 1912 to 1959 inclusive.

Table 23
County Fines and Costs during the Years 1912-1959

YEAR	Number of Prosecutions	Convicted or ordered to pay costs	Dismissals, etc.	Fines and Costs		
				£	s.	d.
1912-1935 ...	1,504	1,302	202	6,239	1	7
1936	22	20	2	107	14	9
1937	39	36	3	165	1	0
1938	26	24	2	132	10	1
1939	19	18	1	100	11	6
1940	25	23	2	171	14	0
1941	84	79	5	824	13	2
1942	38	36	2	502	4	10
1943	54	49	5	375	10	11
1944	38	37	1	291	19	6
1945	33	33	0	365	4	6
1946	94	92	2	936	7	9
1947	98	93	5	667	7	0
1948	70	69	1	703	0	6
1949	48	45	3	518	17	2
1950	43	42	1	405	8	7
1951	50	39	11	362	11	6
1952	65	64	1	620	13	0
1953	54	53	1	576	12	8
1954	45	45	0	294	9	6
1955	42	41	1	261	7	6
1956	20	19	1	185	13	6
1957	21	18	3	371	1	0*
1958	27	26	1	270	4	7
1959	17	17	0	279	13	0
Total ...	2,576	2,320	256	15,729	13	1

*Includes £105 costs ordered by the Divisional Court resulting from an appeal by way of case stated in respect of Sample No. M.7500 and a fine of £2 and £7 cost on the case being referred back to the Magistrates' Court.

Table 24

Prosecutions arising out of Samples purchased during the year 1959

District	Number of Prosecutions	Convicted or ordered to pay costs	Dismissals, etc.	Fines and Costs		
				£	s.	d.
Chadderton U.D.C. ...	1	1	—	25	10	0
Chorley R.D.C. ...	1	1	—	9	18	0
Crompton U.D.C. ...	1	1	—	27	0	0
Denton U.D.C. ...	1	1	—	14	18	0
Failsworth U.D.C. ...	1	1	—	20	6	0
Fleetwood Borough ...	1	1	—	8	3	0
Fulwood U.D.C. ...	1	1	—	19	2	0
Golborne U.D.C. ...	1	1	—	10	19	0
Lancaster R.D.C. ...	1	1	—	10	8	0
Royton U.D.C. ...	1	1	—	27	9	0
Urmston U.D.C. ...	1	1	—	17	5	0
West Lancs. R.D.C. ...	1	1	—	37	15	0
Worsley U.D.C. ...	5	5	—	51	0	0
County Districts ...	17	17	—	279	13	0
Autonomous Authorities	6	6	—	130	14	0
Total—All Sources ...	23	23	—	410	7	0

PART II.—THE MILK (SPECIAL DESIGNATION)
(PASTEURISED AND STERILISED MILK)
REGULATIONS, 1949 TO 1953

*Phosphatase Test, Half-hour Methylene Blue Test and
Turbidity Test*

The above Regulations applying to heat-treated milk (as distinct from other Regulations relating to raw milk) were made jointly by the Minister of Health and the Minister of Food. The Regulations, besides relating to pasteurised milk, also provide for the special designation “sterilised milk.”

The special designations for heat-treated milk are “ Pasteurised ” and “ Sterilised ” but in appropriate circumstances the designations “ Tuberculin Tested Milk (Pasteurised) ” and “ Tuberculin Tested Milk (Sterilised) ” may also be used.

Food and Drugs Authorities are responsible for the granting of pasteurising and sterilising licences but Local Authorities are responsible for all other licences required by the Regulations. The duties of Food and Drugs Authorities include the inspection of records, the inspection of the arrangements for processing milk and the taking of samples in respect of all plants for which licences have been granted.

An amendment to the Milk (Special Designation) (Pasteurised and Sterilised Milk) Regulations which came into operation on the 20th December, 1953, required the compulsory use of overlapping caps on all containers of pasteurised milk from the 1st October, 1954. This same date was fixed in the principal Regulations for the operation of the requirement that pasteurised milk must be put into the containers in which it is to be delivered to customers on the premises at which it has been pasteurised. It follows that the bottling of pasteurised milk from churns by retailers and the sale of pasteurised milk by measure from a can are now both illegal. The amending Order also permits sterilised milk to be processed in cans and other containers of a capacity of not more than one gallon as well as in bottles.

Pasteurised milk must be treated by one or the other of the following processes :—

(a) Retained at a temperature of not less than 145°F. and not more than 150°F. for at least 30 minutes and be immediately cooled to a temperature of not more than 50°F.; or

(b) Retained at a temperature of not less than 161°F. for at least 15 seconds and be immediately cooled to a temperature of not more than 50°F.; or

(c) Retained at such temperature for such period as may be specified by the licensing authority with the approval of the Minister.

Sterilised milk must be filtered or clarified, homogenised and heated to and maintained at such a temperature, not less than 212°F., for such a period as to ensure that it will comply with the turbidity test prescribed.

The Regulations state that samples may be taken at any time while the milk is in the possession of the processor or of the licensed dealer. Unopened bottles should be taken as samples where possible but where the milk is in bulk (exceeding 1 quart) it may be sampled into sterile

bottles. All samples must be carried in insulated containers (not artificially cooled) and they must arrive at the laboratory on the day of sampling.

Three tests are prescribed, a phosphatase test and half-hour methylene blue test for pasteurised milk and a turbidity test for sterilised milk. Samples intended for examination by the phosphatase test must be stored in the laboratory at a temperature between 32°F. and 40°F. while samples intended for the methylene blue test must be stored at the laboratory at an atmospheric shade temperature not exceeding 65°F. No storage temperature is prescribed for samples of sterilised milk.

The statutory phosphatase test depends on the liberation of free phenol from the salt disodium phenyl phosphate by the enzyme phosphatase. This enzyme is always present in raw milk but is almost entirely destroyed by the amount of heat-treatment necessary for efficient pasteurisation, *i.e.*, necessary for the destruction of m-Tuberculosis and other pathogenic micro-organisms. The amount of phenol liberated in the test is an approximate but not directly proportionate measure of the phosphatase remaining in the milk ; a high result indicating insufficient heat-treatment or the presence of raw milk. The test is extremely delicate and it is essential that great care be exercised in collecting the samples for submission to the test, in testing the purity of the reagents used and in the actual carrying out of the test.

The methylene blue test depends on the decolourisation of methylene blue by bacteria and reducing substances present in milk. If under the conditions of the test, decolourisation occurs in less than 30 minutes it is deemed that there has been such a development of bacteria and reducing substances in the milk as to render its keeping quality unsatisfactory. The test is designed to ensure that milk will keep fresh, if kept reasonably cool, until the next day's supply is received by the consumer and with that end in view samples, before examination in the laboratory, are not kept in a refrigerator but are merely kept at atmospheric shade temperature not exceeding 65°F. It should be noted that the half-hour methylene blue test prescribed by these Regulations is quite different from the methylene blue test prescribed in the Milk (Special Designation) (Raw Milk) Regulations, 1949 to 1954, in relation to raw designated milks.

The turbidity test for sterilised milk is based upon the fact that heating to not less than 212°F. for a period sufficient for effective sterilisation will also completely denature all the soluble protein of the milk. Samples which show the presence of soluble protein under the conditions of the test are insufficiently heated or contain raw milk.

The Milk (Special Designations) (Specified Areas) Orders, 1952 to 1959

The sequence of events since the year 1943, which has resulted in the making of a number of Milk (Special Designations) (Specified Areas) Orders, thereby prohibiting the sale for human consumption of raw undesignated milk in the areas specified, was given in some detail in this report for the year 1958. It is perhaps sufficient to say here that Section 37 of the Food and Drugs Act, 1955, makes it compulsory to use special designations in areas which have been made specified areas by orders made under Section 41 of the Act. The special designations which may be used in a specified area are "Tuberculin Tested," "Pasteurised," "Sterilised," "Tuberculin Tested Milk (Pasteurised)" and "Tuberculin Tested Milk (Sterilised)."

The first Milk (Special Designations) (Specified Areas) Order which affected part of the area of the County Food and Drugs Authority came into operation on the 1st November, 1952. Eight other Orders, similarly affecting parts of the County, have come into operation since. By the 6th April, 1959, a total of 90 of the 93 County districts in the County Food and Drugs Area had become specified areas. In view of the fact that it is the duty of the Food and Drugs Authority to enforce the provisions of Section 37 of the Food and Drugs Act, 1955, it follows from the above that an increased number of samples of special designation heat-treated milks are now being taken by County Sampling Officers in the County districts concerned for submission to the County Laboratory for examination by the statutory Phosphatase, Half-hour Methylene Blue or Turbidity tests.

During the year, 1,376 samples of milk were submitted for examination by the Phosphatase test and the Half-hour Methylene Blue test or by the Turbidity test. The samples were marked either Pasteurised, Tuberculin Tested (Pasteurised) or Sterilised and tables 25, 26 and 27 give particulars of the results obtained. Of the 12 County samples which failed the Phosphatase test, five were stated to have been taken at pasteurising plants and seven were obtained in specified areas. All the samples passed the prescribed Half-hour Methylene Blue test.

With regard to the methylene blue test the Regulations prescribe that it shall be commenced between 9 a.m. and 10 a.m. on the day after the sample was taken and that in the meantime, as already indicated, it shall be kept at the laboratory at atmospheric shade temperature not exceeding 65°F. (the sample must not be kept in a refrigerator). During periods of exceptionally warm weather the shade temperature often exceeds the limit specified. Thirty-three samples submitted by County Sampling Officers and two samples from an Autonomous Authority decolourised methylene blue, but these were, however, stored due to

abnormally hot weather conditions at atmospheric shade temperatures which exceeded 65°F., and the tests were therefore void. It should be noted, however, that even when the shade temperature exceeds 65°F., a high proportion of the samples still pass the test ; in view of the fact that keeping quality is particularly desirable in warm weather it is unfortunate that the statutory test cannot then be applied. With regard to the turbidity test it will be observed from table 27 that none of the samples of sterilised milk failed to pass the test.

Table 25
Phosphatase Tests, 1959

Type of Milk	Number Submitted		Number Unsatisfactory					
			County			Borough		
	County	Borough	Group II	Group III	Total	Group II	Group III	Total
Pasteurised ...	562	83	2	5	7	0	0	0
T.T. (Pasteurised)	425	45	3	2	5	0	0	0
Totals ...	987	128	5	7	12	0	0	0

Table 26
Half-hour Methylene Blue Tests, 1959

Type of Milk	Number Submitted		Number Unsatisfactory	
	County	Borough	County	Borough
Pasteurised ...	563	80	0	0
T.T. (Pasteurised) ...	423	45	0	0
Totals ...	986	125	0	0

Table 27
Turbidity Tests, 1959

Type of Milk	Number Submitted		Number Unsatisfactory	
	County	Borough	County	Borough
Sterilised ...	215	46	0	0
T.T. (Sterilised) ...	0	0	0	0
Totals ...	215	46	0	0

PART III.—THE FERTILISERS AND FEEDING STUFFS ACT, 1926

The Fertilisers and Feeding Stuffs Act, 1926, came into force on July 1st, 1928. It is intended to safeguard the purchasers of substances used for the fertilisation of the soil and for the feeding of cattle and poultry.

The general purpose of the Act, like that of the Act of 1906, which it repealed, is to provide civil remedies for the misdescription of, and to prevent fraud in, fertilisers and feeding stuffs. Its scope is defined by Regulations made by the Minister of Agriculture, Fisheries and Food.

In addition, Regulations were made by the Minister of Health during the years 1953, 1954 and 1958 (in exercise of powers first conferred by Section 2 of the Therapeutic Substances (Prevention of Misuse) Act, 1953, now replaced by Section 5 of the Therapeutic Substances Act, 1956), which permit the use of certain antibiotics, *viz.*, penicillin, aureomycin, streptomycin and oxytetracycline, in pig foods and poultry foods and for horticultural purposes. These Regulations prescribe conditions with regard to labelling and also specify in regard to pig and poultry foods maximum limits for the amounts of the prescribed antibiotics which may be present.

It has already been mentioned that the scope of the Fertilisers and Feeding Stuffs Act is defined by Regulations. The Regulations operative prior to the year 1956 were the Fertilisers and Feeding Stuffs Regulations, 1932, to which minor amendments had been made in the years 1942 and 1951. In November, 1955, however, the Minister of Agriculture, Fisheries and Food made the Fertilisers and Feeding Stuffs Regulations, 1955, which came into operation on the 1st January, 1956. These Regulations follow, in general, the form of the 1932 Regulations although they have been completely re-drafted and include amendments recommended by the Standing Advisory Committee. Some of these amendments are concerned with changes in methods of analysis but the Standing Advisory Committee is still engaged in carrying out a general review of the prescribed methods and it is expected that from time to time amending Regulations will be made to give effect to the Committee's recommendations. The first of these amending Regulations was made on the 21st November, 1956, and came into operation on the 1st January, 1957. It provided for an alternative method of determining phosphoric acid in fertilisers and feeding stuffs.

Fifty samples have been examined for the County during the year under review. The number of County samples, therefore, has been maintained at the level reached over the previous ten years. Of these, 26 were fertilisers and 24 consisted of feeding stuffs. The fertilisers

comprised 20 formal samples and six informal samples. All the feeding stuffs samples were formal.

In addition 37 samples (14 formal and 23 informal) were examined for Autonomous Authorities. Of these 29 samples (eight formal and 21 informal) were fertilisers and eight (six formal and two informal) consisted of feeding stuffs.

Of the 26 samples of fertilisers examined for the County 16 were found upon analysis to be correct within the limits of variation permitted by Regulations made under the Act, seven showed minor deviations outside the permitted limits of variation and two of these also had Statutory Statements which were not strictly in the form required. The remaining three unsatisfactory fertilisers are referred to below, two were incorrectly named and the remaining sample had a deficiency in phosphoric acid soluble in water which might have been to the prejudice of the purchaser.

With regard to the 24 samples of feeding stuffs examined for the County, 20 were found to be correct within the permitted limits of variation, the remaining four showed only minor deviations outside the permitted limits of variation.

In the case of formal sample No. 35/2/A, Tomato Manure, the amount of nitrogen found was correct within the limits of variation. The amount of phosphoric acid soluble in water found was less than that contained in the Statutory Statement, the difference being 1·5 per cent. and was less than the minimum allowed by the limits of variation, this difference being 0·75 per cent. On the other hand the amount of phosphoric acid insoluble in water was greater than that contained in the Statutory Statement, the difference being 1·0 per cent. and was greater than the maximum allowed by the limits of variation, this difference being 0·25 per cent. The amount of potash found was also greater than that contained in the Statutory Statement, the difference being 2·6 per cent. and was greater than the maximum allowed by the limits of variation, this difference being 1·85 per cent. The difference in respect of phosphoric acid soluble in water, in your Analyst's opinion, might have been to the prejudice of the purchaser but the differences in respect of phosphoric acid insoluble in water and potash were unlikely to be to the prejudice of the purchaser. The attention of the manufacturer was drawn to the deficiency of phosphoric acid soluble in water and it transpired that the mixing of this fertiliser was only done by manual labour. The manufacturer undertook to stop the sale of this fertiliser until such time as a mechanical mixer had been installed.

Informal sample No. 4/9/B, Raw Bone Meal, was purchased on retail premises for the information of the Inspector. The amount of nitrogen found was correct within the limits of variation. Phosphoric acid, however, was declared at 8.16 per cent. but the amount found was 15 per cent., the difference being 6.84 per cent. Neither the amount of phosphoric acid declared nor the amount found was sufficient to permit the application of the name "Raw bone meal" to this article which was a raw bone meal, Grade II or alternatively a meat and bone meal. The attention of the manufacturer was drawn to the provisions relating to implied warranties, when articles are sold under certain names, contained in the Fourth Schedule to the Act and he gave an undertaking that the article would, in future, be marked "Raw Bone Meal—Grade II."

The remaining sample, No. 5/9/B, was an informal sample of Fish Manure also purchased on retail premises. The amounts declared of nitrogen, phosphoric acid soluble in water, phosphoric acid insoluble in water and potash were found to be correct within the limits of variation. Your Analyst, however, was of the opinion that the sample did not accord with the definition of fish manure contained in the second column of Part 1 of the Fourth Schedule to the Fertilisers and Feeding Stuffs Act but that it accorded with the definition of a compound fertiliser contained in the same Schedule. The attention of the manufacturer was drawn to the implied definition of Fish Manure and he gave an assurance that the fertiliser would be marked "Compound Fish Manure" in future.

The analytical results of all the County samples examined during the year, together with the guaranteed figures contained in the Statutory Statements, are given in the following two tables.

Table 28
Fertilisers

Sample Number and Description	Formal or Informal	Per cent. Nitrogen		Per cent. Phosphoric Acid (P ₂ O ₅)								Per cent. Potash K ₂ O		Other Figs. per cent.
				Total		Soluble		Insoluble		Soluble in Citric Acid				
		G	F	G	F	G	F	G	F	G	F	G	F	
4 Widnes Rose Fertiliser	F	6.5	6.5		7.50	6.0	5.65	1.7	1.85			5.0	5.2	
6/11/A Widnes Granular Fertiliser	F		0.7		13.4	12.75	12.0	1.25	1.4			28.0	29.3	
7/11/A Widnes Granular Fertiliser	F	10.0	10.0		9.80	9.25	9.25	0.75	0.55			18.0	19.0	

Table 28—continued.

[illegible]

Table 28—continued.

Sample Number and Description	Formal or Informal	Per cent. Nitrogen		Per cent. Phosphoric Acid (P ₂ O ₅)								Per cent. Potash K ₂ O		Other Figs. per cent
				Total		Soluble		Insoluble		Soluble in Citric Acid				
		G	F	G	F	G	F	G	F	G	F	G	F	
29/9/A Manchester Steamed Bone Meal	F	0·8	0·9	30·0	31·0									D
40/10/A Seaforth Compound Fertiliser	F	8·0	8·6		3·9	2·5	2·2	1·5	1·7			4·0	5·0	
41/10/A Seaforth Raspberry Manure	F	5·0	5·5		6·4	3·0	3·2	2·0	3·2			10·0	11·0	
29/4/A Lower Blackburn Sulphate of Ammonia	F	21·0	21·2											
7/4/B Lower Blackburn Dried Blood	I	13·5	13·4											
8/4/B Lower Blackburn Liquid Manure	I	9·0	9·2		6·3	6·6	6·3					4·1	4·4	
4/9/B Manchester Raw Bone Meal	I	7·14	6·9	8·16	15·0									
5/9/B Manchester Fish	I	6·0	6·4		6·25	4·5	4·45	1·5	1·80			6·0	5·6	

G — Guaranteed.

F — Found.

A — Guaranteed, Ammonia 6·6 and Tribasic Phosphates 18·8 ; Found, Ammonia 7·2 and Tribasic Calcium Phosphates 17·0.

B — Found, Free Acid (H₂SO₄) Nil.

C — Guaranteed, Free Acid (H₂SO₄) 0·02 ; Found, Free Acid (H₂SO₄) 0·02.

D — Found, Free Acid (H₂SO₄) 0·007.

Table 29
Feeding Stuffs

Sample Number and Description	Formal or In- formal	Per cent. Oil		Per cent. Protein		Per cent. Fibre		Other Figures per cent.
		G	F	G	F	G	F	
33/2/A Lonsdale Indian Meal	F						1.8	A
34/2/A Lonsdale Pig Fattening Meal ...	F	2.75	2.6	13.5	13.3	5.0	3.85	
23/6/A Leyland Sow and Weaner Meal...	F	3.0	3.1	17.5	16.0	5.5	5.3	
24/6/A Leyland Battery Pellets ...	F	3.0	3.1	17.5	15.2	6.0	5.9	B
5 Widnes Pig Meal No. 2 ...	F	2.5	2.9	14.0	13.6	5.5	6.2	
14/12/A Warrington Sow and Weaners ...	F	2.5	2.5	17.0	17.2	5.5	4.8	
27/9/A Manchester Maize Gluten Feed ...	F	2.5	3.1	25.0	26.7			C
20/5/A Hr. Blackburn Layers No. 1A ...	F	4.0	5.0	17.0	15.7	6.0	5.4	
21/5/A Hr. Blackburn “-” Sow Meal ...	F	3.70	3.9	15.65	14.9	4.61	4.8	
21/3/A Kirkham Laying Meal	F	3.0	3.4	17.0	17.9	5.0	4.1	
22/3/A Kirkham Growing Mash	F	3.0	3.7	16.0	16.6	5.5	5.4	
36/10/A Seaforth Battery Layers Mash ...	F	4.0	3.35	17.0	17.6	6.0	4.1	
37/10/A Seaforth Growers Mash	F	4.0	3.6	17.0	18.2	6.0	3.2	
25/6/A Leyland “-” Protective Pig Minerals	F		0.7		2.0		Nil	D
26/6/A Leyland Best Thirds	F					6.0	4.0	E
25/7/A Bury Sow and Weaner Meal	F	4.0	3.4	17.0	17.8	6.0	5.8	
26/7/A Bury Battery Mash	F	4.0	3.7	17.5	18.6	6.0	5.4	
30/9/A Manchester Baby Calf Food ...	F	1.0	0.7	29.0	30.9	0.5	0.25	

Table 29—continued.

Sample Number and Description	Formal or In- formal	Per cent. Oil		Per cent. Protein		Per cent. Fibre		Other Figures per cent.
		G	F	G	F	G	F	
25/4/A Lower Blackburn Laying Meal	F	2.75	2.6	17.5	17.2	4.5	3.8	
26/4/A Lower Blackburn Chick Starter Meal ...	F	3.0	2.6	20.0	18.7	4.5	4.1	
38/10/A Seaforth Intensive Laying Meal	F	2.88	3.05	18.14	18.9	4.2	4.3	
39/10/A Seaforth Sow and Weaner Meal	F	2.7	3.2	16.5	18.0	5.2	4.2	
27/4/A Lower Blackburn Intensive Layers Mash	F	4.0	4.2	17.0	17.8	5.6	4.5	
27/6/A Leyland Meat Protein (Meat and Bone Meal)	F	4.0	3.1	50.0	58.0			H

A — Found, Ash 1.2 and Sand and Other Silicious Matter Nil.

B — Found, Moisture 12.0.

C — Found, Sand and Other Silicious Matter 1.4 and Ash 7.0.

D — Guaranteed, Phosphoric Acid (P_2O_5) 8.93 (equivalent to Phosphorous 3.9).
Found, Phosphoric Acid (P_2O_5) 8.9 (equivalent to Phosphorous 3.9).

E — Found, Sand and Other Silicious Matter 0.2 and Ash 3.3.

H — Guaranteed, Phosphoric Acid (P_2O_5) 9.0. Found, Salt (NaCl) 2.5 and
Phosphoric Acid 9.2.

PART IV.—WATERS, EFFLUENTS, etc.

POTABLE WATERS

Ninety-five samples of water have been examined during the year 1959 for suitability for drinking or domestic use, of which twenty-six were taken at dairies. Thirteen of the total were submitted in connection with the Ministry of Housing and Local Government's geological survey of waters, one of which was examined for fluorine only. One other sample was examined for metals only. The remaining ninety-three samples were submitted for full sanitary analysis, and are classified in the following table according to their source and organic purity.

Table 30
Waters, 1959

Source	Fit	Doubtful	Unfit	Total
Deep Well	13	9	0	22
Disused Mine Workings	2	3	0	5
Shallow Wells	2	5	1	8
Springs	7	3	1	11
Upland Surface	28	9	1	38
Upland Surface mixed with other Water	4	0	0	4
Miscellaneous	2	3	0	5
Total	58	32	3	93

Fifty-five of the samples in the above table were taken from public supplies (12 deep well, 1 disused mine workings, 3 spring, 36 upland surface and 3 mixed waters). Eight of these contained traces of nitrite and one contained a rather high free ammonia. Although such findings may indicate pollution they can also result from chemical treatment of the water and from reduction of nitrate, but special consideration of the bacteriological findings was advised in all these cases. All other water samples from public supplies were satisfactory.

Eleven of the dairy water samples, used for general dairy purposes, were taken from supplies other than public supplies. Three were from disused mine workings, three from a water lodge, three from springs, one from a river, and one from a deep well. Nitrite found in two of the lodge samples, and a slightly high ammonia content in the deep well water, also led to recommendations for special consideration of bacteriological findings, although, as with the public supplies, these may not have indicated pollution.

The three dairy waters from disused mine workings were taken in connection with a complaint that an unsightly precipitate occurred when the water was used with a dairy detergent. The water was acid and readily picked up metal from pipes. It also contained magnesium salts, and these were responsible for the precipitate when alkaline detergent was added to the water. All three samples contained substantial traces of ammonia, which, in view of the metal content of the

water, were probably derived from reduced nitrates ; however, special consideration of the bacteriological reports was also advised with regard to these waters.

Eight samples were submitted in connection with complaints of various kinds, only one of which questioned the cleanliness of the supply, which was from a private spring. This water showed evidence of pollution.

The water shortages caused by the abnormally dry summer in 1959 partly accounted for ten enquiries into the suitability of emergency water supplies for domestic use. Reports appropriate to the chemical findings were given in each case.

Other waters examined included two samples of well water taken for purposes of comparison, before and after passing new high pressure filters, and a sample of tap water taken in connection with a case of seepage into a boiler house.

Twenty-four of the 95 samples were submitted by the County Medical Officer of Health, three by the County Architect and the others by the following Local Authorities : County Boroughs of Preston, 4 ; Southport, 4 ; Boroughs of Chorley, 9 ; Darwen, 9 ; Haslingden, 3 ; Leigh, 1 ; Middleton, 1 ; Rawtenstall, 3 ; Urban Districts of Blackrod, 1 ; Crompton, 1 ; Formby, 1 ; Grange, 2 ; Horwich, 1 ; Lakes, 6 ; Orrell, 3 ; Ramsbottom, 2 ; Urmston, 2 ; Up Holland, 8 ; West Lancashire, 1 ; Walton-le-Dale, 1 ; Standish-with-Langtree, 1 ; Rural Districts of Preston, 1 ; Garstang, 1 ; Lunesdale, 2.

TOXIC METALS IN WATER

Samples which had been in contact with lead, copper or zinc, either in service pipes or during storage, were examined for the presence of these metals.

Seventy-four samples were examined for lead and the results are summarised in table 31.

Table 31

Lead parts per million	None Detected	Less than 0.3	1 to 2	7 p.p.m.
Number of samples	71	1	1	1

All three of the waters which contained lead were from private supplies. The two which contained more than the usually accepted limit of 0.3 part per million were two of the waters mentioned earlier in this

report which were taken from disused mine workings and which were submitted because of precipitation of magnesium salts when alkali was added. The water was very acid, and was carried for a considerable distance through lead pipes.

Sixty-six waters were examined for copper, of these only the water which contained seven parts per million of lead contained a significant amount, the amount of copper present being 1 part per million. The usually accepted limit for copper in potable waters is 1.5 parts per million. Fifteen other waters contained traces of copper, but none of these exceeded 0.25 part per million.

The usually accepted limit for zinc is five parts per million, but this level was not reached in any of the 38 samples tested for it. Eight of the ten samples which contained zinc contained less than 1 part per million. A deposit which was fouling a brass pipe union in a water system was found to consist almost entirely of zinc carbonate.

Iron was found in all of the 75 samples tested for it and 31 of these contained quantities in excess of the 0.3 part per million now regarded as the limit above which complaints of turbidity or staining may arise. The results are summarised in table 32.

Table 32

Iron parts per million	Less than 0.1	Less than 0.3	0.3 to 1.0	1.1 to 5	5.1 to 10	More than 10
Number of samples ...	13	31	20	9	0	2

One of the waters with a very high iron content contained almost all of its iron as insoluble matter in suspension, this was probably due to disturbances of deposits in the main. The other was an untreated borehole water, which also contained traces of hydrogen sulphide.

Manganese causes deposits in mains and produces defects of colour and flavour similar to those of iron, the usually accepted limit for it is 0.1 part per million. It often occurs associated with iron, and of the eight samples which were examined for Manganese, the five in which more than 0.1 part per million was found also contained excess iron. One sample of a black deposit found in a main, consisted almost entirely of Manganese dioxide.

Nine waters examined for their fluoride contents contained quantities ranging from 0.03 to 0.22 part per million. Dental fluorosis in children is caused by concentrations greater than one part per million;

so the above amounts may be considered to be insignificant. A complete mineral analysis was also carried out on six of these waters.

OTHER WATERS, EFFLUENTS, ETC.

Thirty-four samples were submitted under this heading.

Two effluents were examined for compliance with the recommended standards of purity made by the Royal Commission on Sewage Disposal. Neither complied with the recommendations.

A stream water, suspected of being polluted from a factory estate, corresponded to the classification "Bad or Polluted," being, in fact, worse than the general standard recommended for effluents. It also contained hydrochloric acid. Another stream, however, examined to check its suitability for receiving the effluent from a new school, was found to correspond to the classification "Very clean."

Water seeping into a boiler house was found to be very similar to the piped mains water in the building.

Twenty-eight samples of swimming bath and sea bathing lake water were examined for compliance with the Ministry of Health Recommendations (pH should exceed seven but should not exceed eight, and free chlorine should not be less than 0.2 part per million, or much greater than 0.5 part per million). Higher chlorine residuals are, however, desirable where breakpoint chlorination is used, also, at times of heavy bathing, when there is an increase in the amount of ammonia in the water, it is wise to increase the chlorine dose to give an effective residual of free chlorine. Therefore, although 12 samples showed higher chlorine contents than the above recommendations advocate, in no case was advice given to reduce chlorine doses. Heavier bathing loads than usual may have accounted for five cases of low chlorine residuals—one bath being advised, because of high ammonia figures, to change its water in order to regain an excess of free chlorine over chloramines. The remaining samples all complied with the recommendations.

Unauthorised bathers in a river caused an anxious enquiry to be made about the fitness of the water for such sport. The bathing place was found to correspond to the Royal Commission classification "Fairly Clean River," but evidence of the presence of some unoxidised organic matter led to the conclusion that the practice was not one to be encouraged.

PART V.—RADIOACTIVITY

Although no nuclear test explosions were reported in 1959 radioactive debris from tests carried out in previous years was still being

deposited. The measurements started in September, 1958, were continued to determine the extent of the contamination of water and milk in this part of the country and to gain the necessary experience of the lengthy chemical and physical methods involved in the estimation of very low levels of radioactivity in a representative range of foodstuffs.

During the year under review, 98 samples were examined for radioactivity ; these were made up as follows :—Fresh Milk 46, Upland Surface Mains Water 11, Rainwater and Deposits 14, Vegetables 9, Cereals 7, Fresh Fish 1, Shrimps 1, Canned Fish 4, Eggs 1, Coffee 1, Tea 2 and Nuts 1.

FALLOUT

This is the “ ash ” from a nuclear bomb which is carried up into the stratosphere every time a weapon is tested above ground. This dust, which contains nearly 200 different radioactive isotopes, is in the form of extremely fine particles and settles back to earth very slowly, having a mean life in the air of between 1 to 5 years depending on the latitude of the testing site. Fortunately most of the isotopes have very short half-lives and do not reach the ground in significant quantities ; furthermore, many of the elements with longer half-lives are not absorbed or retained by plants and animals. Radioactive strontium 90 and caesium 137, however, with half-lives of 28 and 30 years, are taken up by plants and follow calcium and potassium respectively in the human metabolism. These two elements are responsible for nearly all the internal and external radiation dose to man from fallout material.

UNITS OF MEASUREMENT

Before discussing the results obtained, it might be helpful to describe the units used. Radioactivity is measured in terms of the curie, equivalent to the activity of one gramme of radium ; this is a large unit and for the low level of activity in food a sub-unit, the micro microcurie, is used, this is a million millionth of a curie. These units are not weights but represent the rate of disintegration of a radioactive isotope. An activity of one micro microcurie means that, on average, 2·22 atoms are breaking down every minute producing alpha, beta or gamma radiation. The actual weight of an element having the above activity depends on its half-life and atomic weight and is approximately $0\cdot7 \times 10^{-13}$ grammes for Sr 90.

Strontium and calcium are transferred from the diet to bone in a relatively constant ratio, calcium, therefore, depresses the absorption of strontium 90 by the skeleton. The resultant dose to the bone is determined by the ratio of strontium 90 to calcium in the total diet and not to

its content of strontium 90 alone. It is, therefore, important to determine this ratio which is conventionally expressed in terms of Strontium Units (one S.U. = one micro microcurie per gramme of calcium).

RADIOACTIVITY OF RAINWATER AND ATMOSPHERIC DEPOSITS

As bomb debris settles out of the stratosphere it is quickly removed from the lower atmosphere by rain, so that examination of rainwater provides a convenient method of monitoring for fallout. Rainwater and its associated deposit has been collected each month in an 18 inch square polythene lined funnel leading into a large polythene bottle situated on the roof of the County Laboratory. At the end of each month the water and deposit is boiled down to a small volume in the presence of nitric acid and, after filtering, the total beta radioactivity of the solution is measured. Chemical separation is then carried out to determine the amounts of strontium and caesium isotopes present. The results obtained are tabulated in Table 33.

It will be seen that the rate of deposition increased during the first half of the year reaching a maximum in April to June, although no bombs had been exploded since November 2nd, 1958, showing the long time required for the bulk of the debris to arrive on the ground. By the end of the year the total beta radioactivity and strontium 90 had fallen to about one tenth of that recorded in June. Strontium 89 fallout has also been measured, this is another isotope of strontium with a half-life of only 50.4 days; during nuclear fission it is produced with an activity of approximately 160 times that of the strontium 90. Due to its relatively short half-life, however, this ratio is soon reduced; i.e., after 50 days the Sr 89/Sr 90 ratio is approximately 80 and after 100 days it is approximately 40. Determination of this ratio, therefore, gives some idea of the age of the fallout material being examined and it can also be used to detect new explosions. The table shows the decreasing value of this ratio during the year. The unexpectedly low value for February, which was a dry month, is possibly due to dust from the surrounding area containing older deposits, being blown into the gauge. Strontium 89 had practically disappeared from the deposits by the end of the year.

The average concentration of Strontium 90 in rainwater for the year 1959 was 9.6 micro microcuries per litre and the total amount deposited was 7.78 millicuries per sq. kilometre. This last figure is not greatly different from the rate of deposition of 6.5 m.c. per sq. kilometre, reported by the United Kingdom Atomic Energy Authority for Liverpool for 1958⁽¹⁾.

DRINKING WATER

The International Commission on Radiological Protection recommends that the maximum permissible limit for mixed beta and gamma fission products in drinking water should be 100 micro microcuries per litre; when the figure exceeds this a determination of the isotopes responsible for the radioactivity is necessary before deciding as to its safety. In April the average radioactivity of rainwater with its acid soluble deposit was approximately 1600 micro microcuries per litre and the question arose as to the position of any people depending on stored rainwater for drinking purposes. At the beginning of May a sample of rainwater collected from a house roof and stored for domestic use other than drinking was examined. This settled water had a total beta activity of approximately 470 micro microcuries per litre but only 9 micro microcuries of this was due to Strontium 90; the concentration of this isotope was, therefore, just under half the recommended maximum permissible limit of 20 micro microcuries per litre. The average Strontium 90 activity of rainwater (including deposit) in April was 28 micro microcuries per litre, so that only one third was soluble in the stored rainwater. The Strontium 89, cerium 141 and 144, ruthenium 106 and caesium 137 contents were also determined approximately and calculation showed that the total dose rate received from these if the water had continuously been used for drinking would not be more than one per cent. of the dose rate that could be safely tolerated.

Mains tap water from an upland surface gathering ground was also examined regularly for total beta radioactivity and Strontium 90. The results are shown in table 34. All the figures are very much lower than those for rainwater for the same periods, showing that most of the radioactivity has been removed by filtration through the soil and settlement in the reservoirs. The average Strontium 90 concentration over the year was 0.75 micro microcuries per litre, which is well below the above mentioned recommended maximum limit of 20 micro microcuries per litre for drinking water, and its contribution of Strontium 90 to the daily diet would be less than one tenth of that due to milk.

STRONTIUM 90 IN FOODSTUFFS

Milk

Samples were examined regularly throughout the year because milk is known to be the principle food from which Strontium 90 at present enters the diet in the United Kingdom and because it may form the sole diet of infants. For the first eight months of the year under review the method used in the previous year was continued; i.e., determination of the total beta activity of weekly samples and combining these each month for the determination of Strontium 90; for the latter at least

4 pints are required. During the winter when the cows were living off stored food the milks had an activity of 2 to 3 counts per minute per pint (measured with a liquid Geiger Muller counter). When the cows were grazing fresh grass again in April the activity increased reaching a peak of approximately 11 cpm per pint in the middle of May. This was mainly due to Strontium 89 activity in the fresh grass being higher than in the stored food. Twelve months of sampling by the above method resulted in no individual samples of milk having any significantly different activity from the average seasonal level. A different method of obtaining the bulked sample was, therefore, introduced in September, in order to obtain a more representative sample of the milk produced or consumed in the County area. An aliquot portion was taken from each sample of heat treated milk received in the laboratory for the monthly testing of all the pasteurising and sterilising plants in the County area and the resulting bulked sample, representative of over 2 million gallons of milk, was examined for Strontium 90 each month.

The results obtained for Strontium 89 and Strontium 90 in milk during 1959 are shown in Table 35.

The Strontium 90 activity, which was 11 Strontium units at the end of November, 1958, dropped slowly during the winter, while the cows were indoors, to 8.0 Strontium units and then rose to a peak of approximately 18 Strontium units in May to July after the cows had been turned out to pasture.

The Strontium 89 to Strontium 90 ratio in milk which, as explained previously, is a measure of the age of the contamination, can be used to illustrate the effects of stored food as against fresh fodder, e.g., in February the ratio for milk was below one, whereas the ratio in fresh fallout was about 20, showing that the Strontium activity measured in the milk had come from hay and other food grown the previous year. After April the ratio in the milk was always very similar to that in the current fallout. This illustrates two interesting points, first that most of the activity in milk is due to surface contamination of the herbage with fallout material, and not to absorption of Strontium via the soil, because the Strontium isotopes in the soil have been accumulating now for more than 10 years and the Sr 89/Sr 90 ratio in soil is exceedingly small. Secondly, the results show that there is only a few weeks' time lapse between the cows eating the Strontium contaminated grass and the Strontium appearing in the milk at a proportionate level.

The average level of Strontium 90 activity found in milk for the year 1959 was 11.6 Strontium units, this is appreciably higher than the values of 7.28 and 8.26 Strontium units found for the North West region in the last 9 months of 1958 and in the 12 months ending June

30th, 1959, respectively by the Agricultural Research Council⁽²⁾. This is to be expected as the rate of fallout in the first six months of the year was greater in 1959 than in the corresponding months of 1958; furthermore, the sampling periods and the points of sampling were not identical. The activity of Strontium 90 in milk again increased in the last two months of the year under review the December figure being practically double the October figure. This increase is not due to fresh sources of Strontium 90 (this is confirmed by the declining amounts of Strontium 89), but is due to the cows being fed on hay prepared in the early summer when fallout was at a maximum.

A note on the significance of the Strontium 90 figures shown in table 35 is given under "interpretation of results" at the end of this section of the report.

Vegetables

The Strontium 90 activity of green vegetables is at present mainly due to direct contamination of the surface of the plant by fallout material. The amounts actually determined on a range of vegetables and other foods are given in Table 36. For the first half of the year the rate of deposition was relatively high and this is reflected in the values of 33 Strontium units obtained for the sample of Brussels-prouts and 55 and 66 Strontium units for the two samples of water cress. The water cress also had a relatively high total beta activity (approximately 1,400 micro microcuries per 100 grammes) and was, therefore, examined in more detail. The activity was due to the same elements and in approximately the same ratio as in the current rainwater deposit and calculation showed that a normal amount could be eaten daily indefinitely without giving an undue dose to the consumer. The sample of mustard salad had probably been grown under glass and had only received its Strontium 90 through the soil and from irrigation water, it had, therefore, a much lower level of activity. The shelled peas had an appreciably lower contamination than the runner beans, the latter included the deposit on the outside of the pods not removed by normal rinsing. The cabbage sampled in November, also had a relatively low activity which reflects the lower rate of fallout in the three months previous to harvesting.

Tea

The sample taken early in the year had a relatively high concentration of Strontium 90 and a high Strontium 90 to calcium ratio, so determinations were carried out to find out how much of the Strontium was extractable. Brewed in the usual manner 19% was soluble and the resulting beverage derived from a 3% infusion contained 0.34 micro microcuries per litre from the tea to which should be added the 0.6 micro microcuries per litre in the upland surface tap water used.

Animal Products

Four samples of canned fish (three of salmon and one of crab) showed no detectable radioactivity apart from the natural activity due to potassium 40. A sample of fresh flat fish from a local estuary had an activity of only 4.4 Strontium units while a sample of locally caught shrimps had 14.9 Strontium units. The fresh eggs were from hens kept under free-range conditions; it may be of interest to note that the Strontium 90 to calcium ratio in the shell was less than half that found in the edible portion.

Cereals

The outside of grain has a higher Strontium 90 activity than the inner portion; it is not altogether surprising, therefore, that relatively high values were found in the two samples of wheat bran breakfast food. However, an ounce of these products would only give approximately 2.5 micro microcuries as compared with seven from a pint of milk; furthermore, due to the high phytic acid content of bran much of the calcium and Strontium would probably be insoluble and would not be absorbed by the body.

During the refining of flour much of the Strontium 90 is removed with the bran and, as can be seen from table 36, the amount of Strontium 90 per kilo is progressively reduced in passing from wholemeal flour through brown to white flour. Brown and white flour is required by the Flour (Composition) Regulations to be fortified with 235-390 milligrammes per 100 grammes of creta praeparata (purified chalk) and this further reduces the Strontium to calcium ratio. Unfortunately the white flour sample had less than the required amount of creta (only 106 milligrammes per 100 grammes), while the brown flour had too much (560 milligrammes per 100 grammes), so that the figures in the last column of the table are not typical. If the correct amount of creta had been added the white flour would have contained 9.0 Strontium units and the brown flour 14 Strontium units as compared with the unfortified wholemeal flour with 92.5. There is, therefore, an additional and unintentional beneficial effect resulting from the addition of creta to flour; the amount added contributes approximately one quarter of the calcium in the average diet.

Strontium 90 — Interpretation of Results

Strontium behaves in the body in a similar way to calcium and is deposited with it in the bone skeleton. Fortunately, the body does discriminate to some extent against Strontium so that this element is absorbed and retained at only one quarter of the rate for calcium.

Even so, once Strontium 90 is deposited in the bone its activity is only reduced by half every $7\frac{1}{2}$ years by the processes of radioactive decay and normal biological replacement. In this country, at present, milk provides over half of the calcium and Strontium 90 in the average diet for adults and is the sole source of these elements for bottle-fed babies. Infants are exposed to the greatest hazard as their bones are in active growth and any radioactivity deposited in them has a longer time in which to irradiate the bone marrow ; adult bones take several decades to reach equilibrium with the diet.

The average activity of milk during the year was 11.6 Strontium units. The average concentration in new bone formed during this period, taking into account the above mentioned discrimination factor, will, therefore, be about 3 Strontium units. This would subject the bone marrow to approximately 0.008 roentgens a year. This figure should be compared with the radiation, received by the bones, from natural sources such as cosmic rays and radium and thorium in the bone, which add up to approximately 0.10 to 0.15 roentgens a year to the bone marrow. The International Commission for Radiological Protection has, this year, recommended a maximum permissible body burden of 67 Strontium units in large populations, this amount would give rise to a dose rate of 0.188 roentgens per year to the bone marrow. It should be emphasised that even at this maximum recommended level any harmful effects, such as leukemia and bone cancer, would only be of the order of 10 cases per million people per year and any increase in these diseases due to fallout would only be detectable by statistical methods applied to very large populations. The present level of Strontium 90 in new bone is less than one-twentieth of the above limit.

Strontium units are a convenient way of expressing the concentration of Strontium 90 in the body, in the diet and for comparing the same types of food. When considering the effects of individual foods, however, use has to be made of the actual amounts of Strontium 90 and calcium which they provide in the daily diet ; from the total amounts of each the ratio of these two elements in the whole diet can be calculated. It follows that a food with a high activity of Strontium 90 would not effect the Strontium-calcium ratio of the whole diet appreciably if it had either a high calcium content and/or was only used in small amounts. None of the foods examined would contribute as much Strontium 90 to the normal daily diet as one pint of milk and were all well below the level of 270 Strontium units ; i.e., the level in the whole diet which would lead to the maximum permissible level of 67 Strontium units in the body.

It would require 100 units of Strontium 89, whose half-life is only 50 days, to deliver the same total dose as one unit of Strontium 90. Thus, the effects of the concentrations of Strontium 89 found during 1959, when there was no fresh fallout, are insignificant.

Caesium 137

This element is an alkali metal with a half-life of 30 years and it behaves in a similar way to potassium in plant and animal metabolism. It differs from the Strontium isotopes in giving rise to gamma radiation. Whereas Strontium 90, stored in the bone, emits beta particles with a range measured in millimetres and does not effect the other body cells appreciably, gamma radiation has a relatively long range and affects the whole body including the reproductive organs. In addition, caesium 137 in fallout on the ground increases the background gamma dose rate.

Results for three samples of milk, five samples of rainwater, a mains tap water and three samples of food are shown in table 37. It will be seen that the activity of caesium in fallout is about 1.8 times the activity of Strontium 90 and there is a similar ratio for these two elements in the runner beans and wheat bran. This is to be expected since the contamination is mainly due to absorption by the plant surfaces. The ratio in the mains tap water is very low, i.e. 0.3, due to caesium being more firmly held in soil than Strontium. The ratio in the milk samples is 2 to 3 times the ratio in fallout mainly due to there being a higher discrimination factor against Strontium than against caesium in its passage in the body from the diet through to milk.

Caesium does not accumulate appreciably in the body, half of any absorbed activity being removed by ordinary body processes every 20 weeks. Because of this, the maximum permissible limits for caesium 137 in water and foods is about 6,000 times higher than for Strontium 90. The level of caesium 137 in food, therefore, is never likely to be a problem from the point of view of the safety of the individual as the activity of the Strontium 90 is always the limiting factor.

Although no significant effects are anticipated to the present generation from caesium 137 in food, consideration has also to be given to the genetic effect, i.e. increase of the mutation rate, which might affect future generations. These changes are brought about by the increased gamma radiation from caesium 137 on the ground as well as in the body. It is the total dose received by the reproductive cells in the first 30 years of life which determines changes in the genetic structure of a large population. From weapon tests up to date the genetically significant dose from caesium 137 over 30 years has been estimated at 0.05 roentgens⁽³⁾. Mankind has always, throughout its existence, been subjected to a 30 year genetically significant dose from cosmic rays,

radium, thorium and potassium in the body and from the environment of approximately 3 roentgens. The increase due to weapon tests to date is, therefore, less than two per cent. of the natural level.

Brazil Nuts

A recently published report⁽⁴⁾ has drawn attention to abnormally high quantities of radium in brazil nuts. A food and drugs sample of these nuts submitted to the County Laboratory was, therefore, examined for this element and a 100 gramme portion was found to contain 99 micro microcuries of radium which is equal to the average amount accumulated in the body of an adult. Radium is a bone-seeking element, chemically similar to barium and it is present in most foods but in very much smaller amounts. It is derived from the decay of uranium in the soil. The relatively large amount of radium in brazil nuts is no doubt due to their well known ability to accumulate barium, which property is not shared by other foodstuffs. The amount of barium in this sample was, in fact, 0.16 per cent. Fortunately, both the barium and radium are in an insoluble form, probably as their sulphates, and are not absorbed by the body. The toxic dose of soluble barium is about 0.2 gramme, this amount of insoluble barium would be present in $4\frac{1}{2}$ ounces of the nuts.

References

1. A.E.R.E. Report No. R.3094, 1959, page 7.
2. Agricultural Research Council Radiobiological Laboratory Report No. I, 1958, page 12 ; Report No. II, 1958-1959, page 5.
3. Joint Committee on Atomic Energy, Congress of the United States. Summary—Analysis of Hearings, May 5-8, 1959, Page 40.
4. Second International Conference on the Peaceful uses of Atomic Energy, Geneva, 1958. Conference Paper P/41.

Table 33

Radioactivity of Rainwater and Deposit

(Results are totals from samples collected in an 18 inch square funnel)

Month	Rainfall Collected		Ash of Acid Insol. Deposit	Beta Activity of Acid Insol. Ash Counts per min.	Beta Activity of Water and Acid Sol. Matter Counts per min.	Strontium 89 Microcuries	Strontium 90 Microcuries	Ratio $\frac{\text{Sr 89}}{\text{Sr 90}}$	Caesium 137 Microcuries
	Litres	Inches							
Oct. 1958	22.90	4.30			1024	1556	95	16.4	
Nov. 1958	11.40	2.14	0.446	226	1330	1830	38	45.5	
Dec. 1958	17.90	3.36	1.02	680	2007	1050	38.5	27.3	
Jan. 1959	14.12	2.64	0.86	510	1784	837	28	29.9	
Feb.	2.60	0.49	2.415	324	1090	1486	130	11.4	
March	8.20	1.54	2.43	250	2160	1976	146	13.5	
April	11.36	2.13	1.84	278	2945	2656	319	8.3	
May	7.15	1.34	3.21	491	3542	2170	308	7.0	
June	16.99	3.20	1.15	151	2672	1230	314	3.9	
July	23.70	4.46	1.17	81	2066	480	212	2.3	
Aug.	2.30	0.43	1.28	43	452	84	47	1.8	61
Sept.	2.97	0.56	2.05	58	430	24	17	1.4	34
Oct.	21.45	4.03	2.37	72	499	37	39	0.95	71
Nov.	28.02	5.26	0.60	73	266	27	36.5	0.73	58.5
Dec.	30.86*	5.80	1.19	24	220	3	33	0.1	64

* Approximately 5 litres lost by overflowing in heavy rain.

Table 34

Radioactivity of Mains Tap Water
(*Upland Surface Gathering Ground*), 1959

No.	Dates Collected	Total Beta Radioactivity	Strontium 90
	1959	counts/min/litre in liquid counter	micro microcuries per litre
R.53	30th Jan.	3.00	
R.60	4th Mar.	3.33	
R.68	23rd, 24th, 25th Mar.		0.50
R.80	6th, 7th May	3.70	
R.90	8th, 9th June		1.00
R.100	22nd, 23rd, 24th July	2.70	} 1.00
R.108	18th, 19th, 20th Aug.	1.57	
R.118	17th, 18th, 28th Sept.	1.56	} 0.62
R.122	7th, 16th, 20th, 29th Oct.	1.07	
R.134	17th, 23rd, 30th Nov.	1.52	} 0.76
R.141	8th, 15th, 30th Dec.	1.03	

Table 35

Strontium 89 and Strontium 90 in Milk, 1959

Number	Date Milk Sampled	Strontium 89	Strontium 90	Ratio $\frac{\text{Sr 89}}{\text{Sr 90}}$
		Micro Microcuries per gm. Ca	Micro Microcuries per gm. Ca	
R.47, 49, 50, 51	6th, 9th, 14th, 19th Jan.		10.4	approx. 2.5
R.54, 56, 57, 58	4th, 5th, 10th, 23rd Feb.		8.6	approx. 0.9
R.63, 64, 69	4th, 9th, 17th March		8.0	
R.71, 73, 77, 79	1st, 7th, 16th, 23rd April		10.1	approx. 1.6
R.82, 83, 84, 85, 87, 88	4th, 11th, 14th, 14th, 20th, 25th May	101	18.3	5.5
R.91, 92, 94, 95	June		below 20 from total count	
R.96, 97, 98, 101	1st, 9th, 16th, 27th July	32.7	17.6	1.86
R.105, 107, 110, 111	4th, 10th, 17th, 25th Aug.		11.8	
R.115	Bulked sample Sept.	10.7	8.3	1.3
R.128	Bulked sample Oct.	7.0	6.3	1.1
R.139	Bulked sample Nov.	5.7	9.1	0.6
R.143	Bulked sample Dec.	0.1	12.4	0.1

Table 36

Strontium 90 in Foods, 1959

No.	Sample	Date	Calcium	Strontium 90	
			Per cent.	Micro Microcuries per kilo	Micro Microcuries per gm. Calcium
R.46	Brussels Sprouts	5.1.59	0.024	7.9	33.0
R.61	Mustard Salad	5.3.59	0.086	7.7	8.9
R.65	Water-Cress	12.3.59	0.126	69.0	55.0
R.67	Water-Cress	18.3.59	0.142	94	66.0
R.99	Fresh Peas (shelled)	17.7.59	0.031	2.0	6.2
R.119	Runner Beans	15.9.59	0.025	6.0	24.0
R.121	Potatoes	22.9.59	0.0083	1.4	17.0
R.131	Cabbage	9.11.59	0.072	5.1	7.1
R.59	Shrimps, boiled, picked	25.2.59	0.085	12.7	14.9
R.89	Fresh Fish, flat fish	2.6.59	0.079	3.4	4.4
R.138	Canned Crab	27.11.59	0.095	less than 1.4	less than 1.3
R.76	Tea	22.4.59	0.43	590	135
R.125	Tea	13.10.59	0.43	290	68
R.136	Fresh Eggs (without shell)	25.11.59	0.044	5.6	12.8
R.113	White Flour	18.8.59	0.042 creta added	12.8	30.5
R.102	Brown Flour	27.7.59	0.224 creta added	21.2	9.5
R.106	Wholemeal Flour	3.8.59	0.030	27.8	92.5
R.126	Wheat Bran Breakfast Cereal	13.10.59	0.060	109	182.0
R.132	Wheat Bran Breakfast Cereal	12.11.59	0.058	57.0	98.0
R.133	Wheat Germ	16.11.59	0.048	30.0	62.5
R.137	Oatmeal	26.11.59	0.051	25.3	49.8

Table 37

Caesium 137 in Food and Water, 1959

No.	Date 1959	Sample	Micro Microcuries per kilo	Micro Microcuries per gm. potassium	Cs 137 Sr 90 ratio
R.104 R.109	Aug.	4 pints of milk	77	55	5.6
R.129	Oct.	Bulked milk samples	37.5	26.5	3.9
R.140	Nov.	Bulked milk samples	55	39.3	5.3
R.100	July	Upland surface tap water	0.34		0.3
R.114	8.9.59	Broad Beans	10.5	2.9	
R.119	18.9.59	Runner Beans	7.6	4.4	1.3
R.132	12.11.59	Wheat bran breakfast cereal	132	13.5	2.3
			Micro Microcuries per sq. yd.		
R.112	Aug.	Rainwater	244		1.3
R.120	Sept.	Rainwater	136		2.0
R.123	Oct.	Rainwater	285		1.8
R.130	Nov.	Rainwater	234		1.6
R.143	Dec.	Rainwater	257		1.9

PART VI — MISCELLANEOUS SAMPLES

This section of the report includes those samples which, because of their nature or because of the circumstances under which they were obtained, could not be included in previous sections of the report. Four hundred and forty-five samples were examined under this heading and they were submitted as follows :—County Medical Officer of Health, 22 ; County Education Officer, 1 ; Chief Officer, County Fire Brigade, 3 ; City of Lancaster, 72 ; County Borough of Preston, 94 ; County Borough of Southport, 27 ; Borough of Chorley, 2 ; Borough of Leigh, 72 ; Urban District of Formby, 7 ; Urban District of Orrell, 1 ; Urban District of Urmston, 1 ; Urban District of Walton-le-Dale, 12 ; Rural District of Preston, 2 ; Forestry Commission, 64 ; 65 samples were also examined for the information of the laboratory. The work carried out

on some of the more interesting of these samples is discussed briefly in the following paragraphs.

ATMOSPHERIC POLLUTION

During the year 1959, 159 deposits and rainwater from soot gauges and 186 lead peroxide candles were analysed. These measurements were made on behalf of the County Borough of Preston, the County Borough of Southport, the City of Lancaster, the Borough of Leigh, the Urban District of Formby, the Urban District of Walton-le-Dale and the North-West Conservancy of the Forestry Commission. The contents of the soot deposit gauge at Formby were first submitted for analysis in May, while the Forestry Commission ceased to operate their eight sulphur candle instruments at the end of July on the completion of a three year survey. In the latter half of the year analyses were carried out each month on the contents of 14 soot deposit gauges and on ten sulphur candles.

The standard soot deposit gauge consists of a large glass funnel of known area leading into a bottle large enough to hold a month's rainwater. The soot and water collected are brought into the laboratory at the end of each month for analysis, the minimum number of determinations carried out being those listed in table 38. The sulphur candles are porcelain cylinders of known area which are covered with a layer of lead peroxide prepared under standard conditions. This surface, on exposure at the site, reacts chemically with sulphur gases present in the surrounding atmosphere and when it is examined at the end of the month its sulphate content is proportional to the average concentration of corrosive sulphur gases in the air at that point for the whole of the month. This information is important as it is an indication of the effect of the polluted atmosphere on paintwork, metals, curtains, etc. It should be noted that, even if visible smoke and grit emission from chimneys are prohibited and smokeless zones become more common, sulphur gases will still be released into the atmosphere whenever coal or smokeless solid fuel is burned and it is these invisible gases which cause such damage to man, property and vegetation.

The results from the observations, as well as being of local interest, are also used as part of a nation-wide investigation by the Department of Scientific and Industrial Research to study any long term changes in atmospheric pollution and their possible effects on Public Health, Building Materials, Vegetation, etc.

To illustrate the nature and magnitude of the results obtained in this type of work the average monthly figures for the three sites in the Borough of Leigh are set out in tables 38 and 39. The Manchester Road

and Firs Maternity Home sites are approximately one mile to the East and West of the central Town Hall site respectively. It will be noted that there is appreciably heavier pollution recorded by the Town Hall gauge, the soot and ash being nearly twice the corresponding figures for the other two gauges.

The results obtained for sulphur gases are a little lower than those obtained during the previous five years, notwithstanding the unusually high concentrations recorded during January, when foggy weather resulted in daily averages during this month of 5.47, 5.34, 4.72 milligrams of sulphur trioxide per 100 sq. cms. for the three gauges. The improvement noted during the year 1958 in the amount of deposit collected in the Town Hall Soot Gauge has been maintained.

Table 38
Soot Gauge Observations, 1959
Monthly Averages in Tons per Square Mile

Site	Borough of Leigh		
	Manchester Road	Town Hall	Firs Maternity Home
Rainfall in inches ...	2.30	2.65	2.36
Carbonaceous matter and tar ...	2.25	5.23	3.91
Ash ...	5.39	9.30	4.69
Soluble deposit ...	4.89	6.16	4.77
Total deposit ...	12.53	20.69	13.37
pH ...	4.4	4.9	4.2

* Insoluble Deposit.

Note :—Town Hall Gauge—monthly results for February, March, April, not available.

Table 39
Estimation of Active Sulphur by Lead Peroxide Method—1959
Milligrams of Sulphur Trioxide per 100 sq. cms. of Batch "A" Lead Peroxide

Site	Borough of Leigh		
	Manchester Road	Town Hall	Firs Maternity Home
Daily Averages ...	2.19	2.13	1.86

EXTRANEOUS MATTER IN FOOD, MILK BOTTLES, ETC.

In addition to the samples of food submitted under the Food and Drugs Act which were found to contain extraneous matter the following samples were also examined as the result of complaints. Of the six samples mentioned below four were submitted by the County Medical Officer of Health, one by an Autonomous Food and Drugs Authority and the remaining sample by the Chief Public Health Inspector of a County District.

Milk Bottle, Sample No. M.8013

This one-third pint milk bottle was not chipped or broken and was empty except for dried traces of milk and four fragments of broken glass. The latter weighed in all 0·20 gramme and consisted of a curved sliver of glass measuring approximately $\frac{1}{2}$ inch by $\frac{3}{10}$ ths inch, the remaining three fragments being minute particles. The physical characteristics, appearance and curvature of the large fragment were consistent with it having been chipped off the interior of the rim of the neck of a similar bottle.

Milk Bottle, Sample No. M.8109

This pint milk bottle contained one-third of an ounce of sour milk and a fawn and pink coloured object, weighing 0·36 gramme, which proved upon examination to be a cherry stone to which was still attached a small quantity of the dyed pulp of the fruit. The presence of dyed fruit pulp was consistent with it having been derived from canned or bottled cherries.

Milk Bottle, Sample No. M.8161

This sample consisted of a one-third pint milk bottle which contained traces of milk solids and, adhering to the inside of the bottle approximately $1\frac{1}{2}$ inches from the bottom, a dark grey object which proved upon microscopical examination to be a bird dropping covered with living fungus hyphae and spores. There were also a number of particles, probably derived from the same dropping, scattered over the base and lower parts of the bottle.

Milk Bottle, Sample No. M.8230

This sample consisted of a full one-third pint bottle of milk, the metal foil cap of which was firmly in position and did not appear to have been tampered with. There was no visible foreign matter in the milk itself. The inside surface of the bottle, however, over an area of approximately 8 cms. by 3 cms., extending from the shoulder of the bottle to within 2 cms. of the bottom, was slightly stained brown. Upon

examination this was found to be due to the presence of a film of dried milk solids to which was attached fine particles of iron oxide (rust) together with fungus filaments.

Soft Drink Bottle, Sample No. M.8228

This bottle was empty when received except that it contained a deposit on the base of the bottle. The deposit was mainly in the form of a hard cake firmly adhering to the glass of the bottle, although a small proportion of the material was loose. The total weight of the foreign matter was 3.29 grammes and upon examination it proved to consist of cement mortar (sand and cement). Washings from the bottle also gave reactions for the presence of sugar which was consistent with the bottle having contained a soft drink.

Bread, Sample No. M.8279

This sample consisted of two slices of bread. There was a crescent shaped discoloured area, approximately 1 inch by 2/10ths inch in the centre of, and extending through, each slice. The total weight of the discoloured crumb was 0.32 gramme and the discolouration was found to be due to particles of iron oxide or rust. There was no chemical evidence of the presence of any mineral oil associated with the discoloured material, nor was there any microscopical evidence of the presence of atmospheric dust.

The following miscellaneous samples may also be of interest :—

Cake Colouring, Sample No. M.8000

This sample was examined in connection with a Food and Drugs Act sample (Steak and Kidney Pie, No. S.9619, see table 21) which had been submitted as the result of a complaint of discolouration. The inner pastry of the pie was found to be coloured green with a permitted coal tar colour (Green S). The sample of brown cake colouring was stated to have been used in the gravy added to the pie. Apparently, this particular colouring had only been used because the bakery had run short of the normal caramel preparation used for gravy making although the original container of the cake colouring did bear a label in small print which stated, “. . . . not suitable for use in gravy brownings or for the colouring of any meat products.” Upon examination the colouring was found to consist of a syrup coloured dark brown with a mixture of three permitted coal tar colours, viz.:—Chocolate Brown H.T., Yellow RY and Green S. The discolouration of the pie pastry was found to be due to the fact that when added to gravy and meat the brown and yellow components are strongly absorbed on the meat while the Green S is not held in this way and diffuses into and colours the

surrounding pastry. As a result of this complaint the manufacturers of the colouring matter agreed to increase the size of the print on the label which stated that it should not be used to colour meat products.

Skimmed Milk Powder, Sample No. M.8002

This sample taken at a school kitchen, was submitted as the result of a complaint that after mixing with water or milk, it curdled on boiling. Upon examination it was found to be normal in composition for spray dried skimmed milk powder, its acidity (as lactic acid) being 1.5 per cent. and its solubility at 20°C. being 99.7 per cent. When reconstituted with water to the consistency of fresh skimmed milk (1 pound powder to 1 gallon of water) the mixture was perfectly satisfactory both before and after boiling. It transpired, however, that it had been used at the rate of 3 lb. of powder to 1 gallon of milk for adding to mashed potatoes (this mixture contains approximately four times the solids of fresh skimmed milk); while for custard it had been used at the rate of 28 lbs. powder to 9 gallons of water (resulting in a mixture with approximately $2\frac{1}{2}$ times the solids of fresh skimmed milk). At such high concentrations difficulty will be experienced due to the larger amounts of albumin and other proteins which will be coagulated on boiling; this could be confused with ordinary acid curdling due to development of acidity.

Pullets, Samples No's M.8150 and M.8151

The bodies of these two birds were submitted on suspicion that they had been killed with zinc phosphide rat poison. On opening the body cavity of the first bird a strong characteristic odour of phosphine was noted and the crop of this bird was found to contain 0.16 per cent. zinc phosphide (equivalent to 130 milligrams of zinc phosphide in the crop). The body cavity of the other bird did not noticeably smell of phosphine and the crop only yielded 0.01 per cent. zinc phosphide (or 4 milligrams in the whole crop).

Leaves, Sample No. M.8340

This sample consisted of three different varieties of leaves, obtained from the same garden, which all bore black and pitted spots or burns on the top surface of the leaves. The unmarked portions of the leaves

and the blacked and pitted portions gave the following results upon analysis :—

	<i>Green Portion</i>	<i>Pitted and Blackened Portion</i>
Iron (as Fe) calculated to dry matter of leaf ...	0·058 per cent.	0·081 per cent.
Vanadium (as V_2O_5) calculated to dry matter of leaf ...	Nil	0·018 per cent.
Sulphate ...	Trace only	Present
Mineral Oil ...	Nil	Nil

As the result of the examination of the leaves the opinion was expressed that the leaves had been burned with particles of mineral matter of the nature of furnace ash possibly derived from a furnace using fuel oil.

Cream Cartons, Sample No. M.8346

An examination of table 21 will show that three samples of cream were reported upon adversely in that they contained traces of formaldehyde derived from the synthetic resin used in the bonded paper from which the cartons were made. The cartons were all obtained from the same source. The present sample consisted of three empty cartons taken from stock at a dairy later in the year in order to ascertain if they would be satisfactory in use. The material of one of the cartons yielded 600 parts per million of formaldehyde while the other two cartons were free from formaldehyde. The unsatisfactory stock was at once replaced by the manufacturers.

In addition to the above, three samples of antifreeze mixture for use in the cooling systems of motor vehicles were examined for the Chief Fire Officer in order to ascertain whether they conformed to the requirements of the draft British Standard for Type B antifreeze (Sodium benzoate and Sodium nitrite inhibited). A sample of Soap Powder was also examined for the Chief Education Officer in order to ascertain whether it conformed to the appropriate specification.

